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Ecological Survey of Mountaineer Creek RNA

Todd Keeler-Wolf

May 1991

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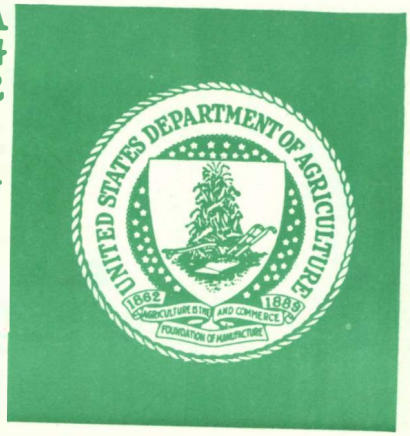

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ECOLOGICAL SURVEY OF THE PROPOSED MOUNTAINEER CREEK RESEARCH NATURAL AREA SEQUOIA NATIONAL FOREST, TULARE COUNTY, CALIFORNIA

Todd Keeler-Wolf

May 1991

(Purchase Order # 40-9AD6-9-0407)

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INTRODUCTION

The Mountaineer Creek candidate RNA (MCRNA) lies within the Tule River Ranger District, Sequoia National Forest. Virtually all, but the southernmost tip of the area lies within the Golden Trout Wilderness. The area was nominated by the Sequoia as a candidate in 1985 following field evaluation by James Shevock (then Forest Botanist, Sequoia NF) and Ed Horton (Regional Office) in 1983. MCRNA was chosen to represent the red fir (*Abies magnifica*)[1] target element for the southern Sierra Nevada physiographic province of the Region 5 RNA system.

The MCRNA as defined in this report covers ca. 1603 acres (648.8 ha) encompassing the entire drainage of South Mountaineer Creek (maps 1 and 2). This includes all or portions of sections 1, 2, 3, 10, 11, and 14 T20S, R 31E and sections 35 and 35 T19S, R31E MDM. The approximate center of the RNA is latitude 36° 12' 30" N, longitude 118° 35' W.

The overall topographic relief ranges from a low elevation of about 6840 ft. (2085 m) near the junction with Mountaineer and the South Fork of Mountaineer Creeks to a high point of 9236 ft. (2815 m) at the southernmost end of the RNA. This represents a range of 2396 ft. (730 m).

Access:

The MCRNA is accessible by road from the south via the following route:

Beginning at the Tule River Ranger Station on State Highway 190 east of Porterville, continue east through Springville and Camp Nelson to Quaking Aspen Camp at the junction with Forest Road 21S50. Distance from the Ranger Station to this junction is approximately 27.4 miles (44 km) and travel time is about 1 hour. Follow 21S50 north to its terminus approximately 10 miles (16 km) from the junction with Highway 190. Driving time for the length of 21S50 is about 1/2 hour. The terminus of 21S50 is the Summit Trailhead (31E14). A small unimproved dirt car park with room for about 10 vehicles lies within ca. 100 m of the crest of the ridge marking the RNA boundary in the SE 1/4 SE 1/4 sec. 2. This spot, or the log landing area at the end of a spur ca. 0.5 miles (0.8 km) east of said parking area (NE1/4 SW 1/4 Sec. 1) are the logical staging grounds for entry into the RNA (see maps 1 and 2). Total travel time from the Ranger Station to the edge of the RNA is approximately 1.5 hours and the total distance

[1] all scientific names in this report are in accordance with Munz (1968)

about 37.4 miles (60 km).

Travel within the MCRNA is facilitated by a maintained trail (31E14) which traverses the middle section of the RNA en route to Maggie Lakes and Sequoia National Park. Another discontinued trail (shown on old 1977 Forest Service edition of Camp Nelson 7.5' quadrangle as 31E20) follows the South Fork Mountaineer Creek up from its junction with Mountaineer Creek (and maintained trail 32E10) and ascends the north-facing slope in the E 1/2 sec. 2. This trail is still walkable for most of its length.

Cross-country travel in the RNA is relatively easy. The entire length of the creek bed can be followed with little difficulty, as there are few large boulders and cascades. Slopes are moderate to steep throughout the drainage, but there are few shear cliffs and rocky areas. In general, the southwestern end of the drainage (the higher elevations), is more gently-sloping than the northeastern end.

PRINCIPAL DISTINGUISHING FEATURES

The MCRNA has been nominated to represent the red fir target element for the southern Sierra Nevada province. Approximately 70% of the RNA is dominated by red fir. The diversity of stands of this species within the area is typical for this target, and thus, the area makes an excellent RNA for the red fir target. The area includes several age groups of red fir with the largest averaging about 140 years. Older stands of trees between 200 and 350 years old occur at the higher elevations and are scattered elsewhere in protected areas.

The red fir element at MCRNA is represented throughout the majority of its environmental range. It occurs on all major slope directions ranging from low elevation creekside stands to high elevation south-slope stands. Ecotonal borders between red fir and and white fir (*Abies concolor*) forest occur at low elevations and between red fir and upper elevation mixed coniferous forest on warmer slopes. The north-facing red fir stands grade into western white pine- (*Pinus monticola*) dominated forest at the highest part of the drainage. In the high, mesic basin at the southern head of the creek, red fir becomes subordinate to lodgepole pine (*Pinus contorta* ssp. *murrayana*).

The montane wet meadow target element is also well represented within the area and includes a number of lush hanging meadows with a diversity of dominance types. Aquatic value of the area is high with much of the stream perennial, and supporting a population of Little Kern golden trout (*Salmo aguabonita whitei*) a Federally listed threatened species.

The majority of the area is underlain by granitic rock, however, a small portion of the northeastern side of the drainage has metamorphic parent material.

JUSTIFICATIONS FOR ESTABLISHMENT AND BACKGROUND ON TARGET ELEMENT

Red Fir:

The red fir forest has long been recognized as a major distinctive vegetation type of the upper montane zone in California (Oosting and Billings 1943, Barbour 1988). It is one of the best ecologically studied forest types of the California mountains, with a number of publications devoted to it (see Barbour 1988, Rundel et al, 1977).

Red fir is considered a mesophile and its dominance in the zone of greatest snow accumulation in the California mountains underscores its requirements of high moisture availability during the growing season. However, it is not as hydrophilic as lodgepole pine and is sensitive to waterlogged and poorly drained soil (Laacke and Fiske 1983).

The Mountaineer Creek RNA is only 28 miles (45 km) north of the southernmost extent of red fir (on Sunday Peak in Kern County, Griffin and Critchfield 1976). Despite its southerly location in the approximately 525 mile north-south range of the species (Little 1971), the representation of the species at MCRNA is typical for much of the Sierra Nevada. At low elevations, it is restricted to north slopes and cold air drainage areas, but occurs widely above 7200 ft. (2195 m) on many slope exposures over a 2000 ft. (610 m) vertical distribution. Widespread associates of the forest type such as western white pine and lodgepole pine also occur in typical conditions and densities within the drainage.

Even-aged stands are the rule for red fir throughout its range (Rundel et al 1977). Stands dominated by one main cohort are usually related to abundant germination following crown fire. The red fir forest at Mountaineer Creek shows evidence of crown fire. As with white fir forest (Conard and

Radosevich 1982, Laacke and Fiske 1983) red fir's thin bark, long-lived crowns, retention of branches, heavy litter accumulations, and typical high density stands promote the spread of crown fire.

The most recent major fire in the MCRNA occurred about 140 years ago (ca. 1850). This fire affected the canopy in at least 60% of the drainage. Both northerly and southerly-facing slopes were affected. Growth rates of the 140 year old cohort vary, with north-slope trees averaging consistently smaller than south-slope or east-slope stands. Stands spared from this fire occur in several areas including the southern head of the drainage and the upper slopes of the southeastern part of the drainage. Numerous isolated old individuals occur at edges of rocky areas and meadows and occasional large survivors occur within the young even-aged stands. These survivors contributed to the production of the 140 year old stands.

Dense, young reproduction is limited in the area, as much of the forest is relatively young and even aged, with few openings suitable for seedling establishment. Dense reproduction patches are associated with small windfall gaps in the more mature stands.

The Mountaineer Creek candidate RNA is the only recommended RNA currently being considered by Region 5 as a representative of the red fir target element for the Southern Sierra Nevada province. Two other candidate RNAs have been targeted for this element in the province, and were subsequently dropped from consideration. The Teakettle Creek candidate RNA (Griffin 1975) has an excellent representation of the target, but was dropped because it lies within an Experimental Forest (current RNA policy excludes Experimental Forests from RNA candidacy). The other dropped candidate is Bourland Meadow (Talley 1977). This area also contains excellent representation of red fir, but was de-selected by the Stanislaus NF, following determination that multiple use conflicts were too high. Bourland Meadow is again being considered as an RNA, but will represent the moss bog target (Connie Millar, PSW RNA committee member, *in lit.* 1990).

In addition to the above dropped candidates, two other established or soon to be established RNAs in the Southern Sierra Nevada, Moses Mountain RNA (Keeler-Wolf 1989) and Bell Meadow (Keeler-Wolf 1985) also contain red fir forest. Although Bell Meadow only contains a few acres, Moses Mountain has

about 222 acres (90 ha) of red fir forest (23% of area). Moses Mountain was selected to represent the giant Sequoia (*Sequoiadendron giganteum*) target. The red fir forest is limited to the upper slopes and is relatively inaccessible. It also contains a high percentage of open stands on rocky soil and stands that have been subjected to periodic avalanches. Unlike the situation at Mountaineer Creek, high density, high basal area stands are not widespread at Moses Mountain.

Another candidate RNA in the province has been selected as a red and white fir area, Home Camp Creek (Sierra National Forest). This area has not had an ecological survey and, at present, little ecological information exists for it.

Rare Plants:

Two species listed by The California Native Plant Society as species of limited distribution (List 4 of Smith and Berg 1988) occur in the RNA. These are the Sierra Corydalis (*Corydalis caseana* ssp. *caseana*) and the Mineral King Draba (*Draba cruciata* var. *cruciata*). The corydalis is a large, striking member of the herbaceous flora of MCRNA (photos 1 and 2). It is locally common and widespread in streamside and rivulet situations which remain wet throughout the growing season. In the drainage it occurs from about 6900 to 8600 ft. (2103-2621 m). Its distribution is spotty in the Northern Sierra and adjacent Cascades from Shasta to Placer County. Interestingly, it is only known in the southern Sierra from Tulare County, apparently skipping over 200 miles (322 km) of the central Sierra (Smith and Berg 1988).

The Mineral King Draba is restricted locally to the highest north-facing slopes in the MCRNA (above 8800 ft., 2682 m) . Here the small, but showy yellow flowered plants occur fairly commonly beneath an open canopy of western white pine and red fir (photo 3). The plant typically grows on steep rocky slopes, which have late snow melt. This location is within a mile (1.6 km) of the southernmost known occurrence for this taxon (J. Shevock, pers. comm, 1991).

Rare Animals:

The Federally threatened Little Kern golden trout (Steinhart 1990) is native to the Mountaineer Creek drainage, although introduced non-native rainbow trout (*Salmo gairdneri*) have apparently hybridized with the species in parts of the drainage. Efforts by the State Department of Fish and Game to

remove the hybrids and other non-native fish from South Mountaineer Creek were to be undertaken in August 1990 (pers. comm., F&G field crew, June 1990). Following the eradication (using rotenone) pure-bred Little Kern golden trout are to be re-introduced. This procedure will be done for every stream and lake supporting fish in the entire Little Kern River drainage with a projected completion sometime in the mid-1990's (Steinhart 1990).

Prior to this eradication process in June 1990 all trout seen by this observer along South Mountaineer Creek appeared to be "pure" Little Kern golden trout. These were mostly small individuals averaging 5-7 inches (13-18 cm) in length with the largest seen ca. 10 inches (25 cm). These fish were noted in South Mountaineer Creek from the lowest elevations to about 7800 ft. (2377 m) The largest individuals and the highest densities appeared below 7200 ft. (2195 m).

In addition to the trout, a golden eagle (*Aquila chrysaetos*) was seen soaring over the drainage on one day of the survey. This species is considered a species of special concern by the State Department of Fish and Game (Steinhart 1990).

Wet Meadow Vegetation:

Several extensive wet hanging and lotic meadows (*sensu* Ratliff 1985) occur in the area. They include several of the series described by Ratliff (1982) such as *Carex nebrascensis, Calamagrostis canadensis,* and hillside bog. The most extensive of these wet meadows covers about 10 acres (4 ha) at the head of the South Fork Mountaineer Creek between ca. 8300 and 8600 ft. (2530-2621 m) (photo 4). These meadows are largely undisturbed and appear to not have been extensively grazed by livestock for many years. They are the most productive and species rich communities in the RNA.

PHYSICAL AND CLIMATIC CONDITIONS

The MCRNA lies along the southern extension of the Great Western Divide in the southern Sierra Nevada. South Mountaineer Creek drains northeastward into Mountaineer Creek, which flows into Alpine Creek and the Little Kern River. Slopes are more gradual on the eastern side of the divide than on the precipitous western side, which drains into the Tule River. The South Mountaineer Creek drainage is over three times as long as it is across, and is flanked by long, gradually descending ridges.

The majority of the area is underlain by granitic rock of the Sierra Nevada Batholith (Jennings et al 1977) with just a few small outcrops of Paleozoic metamorphics (Schweikert 1981) in the eastern portions of the drainage. Floristically, the area is typical of the main montane belt of the Sierra Nevada. However, an eastern Kern Plateau influence is noticeable with east-side Kern Plateau species such as *Ceanothus pinetorum* and *Tetradymia canescens* in the most xeric locations of the drainage.

No temperature or precipitation recording stations exist within or adjacent to the MCRNA. The closest temperature and precipitation recording site with a climate similar to the RNA is at Lodgepole Ranger Station in Sequoia National Park, which began recording weather data in 1967. This site lies at latitude 36° 36' N and longitude 118° 44' W. or approximately 24.5 miles (39.4 km) NNW of Mountaineer Creek RNA. Lodgepole Ranger Station is at an elevation of 6735 ft. (2053 m) along the Marble Fork of the Kaweah River. The following tables summarize the data from the Lodgepole Ranger Station for the years 1974-1985.

Table 1: Temperature data (°F) summarized from the years 1974-1985 at Lodgepole Ranger Station, Sequoia National Park.

year	x ann. temp.	highest temp. (w/date)	lowest temp. (w/date)	last spr. frost	first fall frost	# days between 1st & last frost
74	41.9	83 (6/13)	-4 (1/3)	6/20	10/4	106
75	-	84 (7/27)	-1 (4/7)	6/24	7/2	8
76	41.8	86 (9/1)	-2 (3/4)	6/12	7/20	20
77	42.4	85 (8/1)	2 (3/17)	5/29	9/15	109
78	39.9	86 (8/6)	-7 (12/7)	6/25	7/1	6
79	40.5	86 (7/17)	-10 (1/30)	6/19	7/6	17
80	41.0	86 (7/28)	5 (12/8)	6/15	7/4	19
81	43.0	89 (8/8)	-3 (2/1)	6/13	9/25	104
82	-	83 (7/30)	-4 (1/22)	6/8	7/1	23
83	40.3	84 (8/7)	1 (1/20)	6/21	7/20	29
84	41.9	87 (7/6)	-4 (12/17)	6/10	9/24	106
85	41.1	88 (7/28)	-5 (2/4)	6/3	9/10	99
mean	41.4	85.6	-4			53.8

Table 2: Precipitation data for Lodgepole Ranger Station, Sequoia National Park 1974-1985.

year	January		July		Total	
	in.	mm	in.	mm	in.	mm
1974	11.50	292	-	-	41.94	1065
1975	2.29	58	T	T	40.79	1036
1976	0.10	3	0.60	15	24.74	628
1977	2.55	65	0.17	4	30.46	774
1978	14.50	368	0.44	11	-	-
1979	6.54	166	0.30	8	40.26	1023
1980	29.11	739	0.19	5	69.65	1769
1981	10.08	256	0.02	1	40.55	1030
1982	13.99	355	0.43	11	90.47	2298
1983	12.93	328	0	0	83.27	2115
1984	0.03	1	2.63	67	33.49	851
1985	3.82	97	0.72	18	38.95	989
means	8.95	227	0.49	12.8	48.60	1234

As can be seen from Table 1 the temperatures at low elvations in MCRNA are likely to be relatively low with the highest temperature at Lodgepole over the 12 year period less than 90° F (32°C) and the lowest temperature -10° F (-23° C). The frequent records of frost (32°F or 0°C, or lower) in late June and even in July are an indication of the relatively short growing season.

The precipitation pattern at Mountaineer Creek is probably similar to that of Lodgepole with January and February averaging the highest precipitation and the summer months relatively dry. Compared to the central Sierra, the area probably receives somewhat more summer precipitation from thunderstorms. Over the 12 year period shown in Table 2, 75% of all July months had measurable precipitation largely resulting from thunderstorms.

Isohyets in Rantz (1972) suggest average annual precipitation in the RNA ranges from about 40 inches (1016 mm) on the western side along the crest to between 25 and 30 inches (635-762 mm) at the lowest elevations on the eastern side of the area.

According to Kahrl (1979) the Mountaineer Creek area averages 50-75 inches (1270-1906 mm) of snow on April 1. A snow course at the old Enterprise Mill at 6600 ft. (2012 m) in the Mountain Home State Forest (36° 14.6' N, 118° 40.7' W) approximately 4 miles (6 km) W of the RNA has an average April 1 water content of 16.6 inches (422 mm) (California Department of Water Resources 1988). Snow depths, as indicated by *Letharia* lichen growth on tree trunks at sheltered sites at low elevations of the RNA, average ca. 36-45 inches (914-1143 mm). In dense red fir forest on nw-facing slopes at 8400 ft. (2560 m) snow depth averages ca. 11 ft. (3.4 m).

Temperature is likely to decrease substantially with elevation in the MCRNA. The records at Lodgepole are equivalent to the lowest elevations in the RNA. Average annual temperatures at ca. 8800 ft. (2682 m) are probably ca. 34° F (1.1° C). During the visit to the area June 19-22, 1990 there were few clouds and temperatures were mild with a high temperature at 8200 ft. (2500 m) of 77° F (25° C) and a low of 47° F (8.3° C).

VEGETATION AND FLORA

The flora of the MCRNA is relatively rich with about 220 taxa of vascular plants detected during the four day visit (appendix 1). The hydric meadow and streamside communities contain the highest number of species. The large range of elevation and slope exposure also influences the high species diversity. One rare species, the Sierra Corydalis, is restricted to the lotic (flowing water) meadows and streamsides and the other, the Mineral King Draba, is only found in rocky subalpine situations at the highest elevations.

Vegetation Types:

The vegetation map (map 3) is based on the Holland classification (Holland 1986). Following is a description of the major plant associations occurring in the MCRNA. Table 3 indicates the acreages of the vegetation types. The code numbers following the names of the associations are Holland type numbers. Associations are listed in order of decreasing size. See table 3 for equivalent acreages of SAF (Eyre 1980) and Kuchler (1966) cover types.

Table 3: Area by cover types for Mountaineer Creek RNA with code numbers for Holland (1986), SAF (Eyre 1980), and Kuchler (1966) classifications.

	% total	acres	hectares
HOLLAND TYPES			
Mixed Montane Chaparral (37510)	2.1	34	13.8
Montane Meadow (45100)	2.8	45	18.2
Upper Montane Mixed Coniferous Forest (85200)	13.8	221	89.4
Sierran White Fir Forest (84240)	7.7	124	50.2
Red Fir Forest (85310)	69.3	1110	449.2
Lodgepole Pine Forest (86100)	2.2	35	14.2
unclassified	2.1	34	13.8
totals	100.0	1603	648.8
SAF TYPES			
Sierra Nevada mixed conifer (243)	13.8	221	89.4
White fir (211)	7.7	124	50.2
Red fir (207)	69.3	1110	449.2
Lodgepole pine (218)	2.2	35	14.2
Western white pine	2.1	34	13.8
unclassified	4.9	79	32.0
totals	100.0	1603	648.8
KUCHLER TYPES			
Chaparral (29)	2.1	34	13.8
Mixed Conifer Forest (5)	21.5	345	139.6
Red Fir Forest	69.3	1110	449.2
Lodgepole Pine--Subalpine Forest (8)	2.2	35	14.2
unclassified	4.9	79	32.0
totals	100.0	1603	648.8

Red Fir (85310):
The majority of the red fir forest at MCRNA is monospecific and uniform in age, resulting from the extensive crown fire of the mid-1800's. The canopy fire affected the mid- and upper slopes of the central portion of the drainage, stretching west to the summit divide in the SE 1/4 sec. 3 and the NE 1/4 sec. 10. However, elevations above ca. 8600 ft. (2622 m) in sec. 11 and adjacent sec. 14 did not sustain widespread canopy damage. It is in these areas and in small pockets scattered throughout the area that the remaining old growth (> 200 years) red fir exists. Small patches or individual old trees tend to occur adjacent to meadows (photo 4) and rocky areas where mesic conditions and open spacing of trees precluded crown fire. Much of the creek-side stands are also dominated by older trees.

Western white pine is the most regular tree associate with red fir, but it is not common or ubiquitous. It occurs in low densities only on northerly-facing exposures throughout the majority of the forest. Within the main body of the red fir forest in the RNA, western white pine increases in importance only in relatively open rocky areas as at the edge of talus chutes or outcrops. Its regional importance rises only at the highest elevations on rocky north slopes (see discussion of western white pine forest). Lodgepole pine associates with red fir in mesic to hydric situations along the wider portions of creek bottom on the lower reaches of South Mountaineer Creek (photo 5), and in the upper basin adjacent to meadows. Both situations are subject to regular cold air drainage in the evenings and remain cool and moist throughout the growing season. White fir forest forms a relatively narrow zone of overlap with red fir forest on the northwest-facing slopes in the lower portion of the drainage.

The red fir forest was sampled using thirty-five 10 x 10 m plots laid out every 75 paces along a transect. The transect followed the trail 31E14 from the point where it first tops the ridge in the NW 1/4 NW 1/4 sec 2 at ca. 8560 ft. (2609 m) to a point ca 100 m west of the Wilderness Area boundary in the NE 1/4 SE 1/4 sec. 2 at ca 8240 ft. (2512 m). The transect covered all major slope aspects represented locally by the red fir forest including E, SE, NE, N and NW. Elevations on the transect ranged from ca. 7960 to 8560 ft. (2426-2609 m).

The sample indicated an overall average density of 669 red fir trees/ha (over 2 m tall). The only other tree present in the sample was western white pine at an average density of only 17 trees/ha. Average basal area

cover was 116.7 m^2/ha for red fir and 0.6m^2/ha for western white pine (total average for the forest 117.3 m^2/ha).

About 90% of the transect was affected by the crown fire ca. 1850. The transect had a canopy cover averaging 56% with only six plots averaging less than 40% and 10 plots averaging at least 70%. The mean diameter of trees was about 18.5 inches (47 cm) and an estimated 75% of the trees were members of the 140 year old cohort. This included shade-suppressed trees only 5 inches (12.7 cm) dbh and 20 ft. (6 m) tall as well as well-formed individuals 39 inches (99 cm) dbh with heights of 130 ft. 39.6 m). Trees exhibiting the most rapid growth were associated with relatively open canopy and southeast-facing slopes. Slowest growing trees occurred on northwest exposures in dense stands.

Only a few plots had relatively dense stands of young saplings. These consistently occurred in areas averaging less than 30% crown cover. These sapling-dominated openings were typically associated with patches of older forest which had been affected by recent canopy damage due to wind-throw. Sapling density over the sample averaged only 400/ha with extremely low densities in continuous stands of 140 year old trees (photo 6). Seedling (under 6 inches, 15 cm in height) density was considerably higher than sapling density, averaging 2897/ha. However, over 90% of the seedlings were recently germinated (many with attached seedcoats). The vast majority of them (particularly those germinating in shady, high-duff conditions) will doubtless succumb before establishing.

The largest trees encountered were between 68 and 73 inches (173-185 cm) dbh and up to 170 ft. (51.8 m) tall. These individuals were clearly survivors of the crown fire and either occurred on southeast-facing slopes adjacent to rocky openings or in mesic valley bottom or meadowside locations. Some had damaged crowns with branch ramifications, suggesting prior wind or lightning damage. The ages of these trees were estimated at between 250 and 350 years.

As a result of the uniform canopy conditions and shady, high duff-forest floor, the cover of shrubby and herbaceous understory species in the sample was low and largely restricted to the scattered sunny openings. Table 4 indicates the results of the sampling for these 26 species. Total ground cover for herbs and shrubs averages about 6%. About 46% of all plots had only a trace or no cover at all from the herb and shrub synusae.

These coverless plots were invariably associated with high crown cover and duff accumulation. Only a few species appeared to tolerate relatively high shade. These include *Dentaria pachystigma, Pedicularis semibarbata, Pyrola picta,* and *Corallorhiza maculata*. *Chrysolepis sempervirens* and *Angelica lineariloba* occurred most frequently in steep rocky (stabilized talus) areas on north slopes. *Hackelia* sp., *Monardella odoratissima, Collinsia torreyi, Draperia systyla, Lupinus andersonii,* and *Senecio integerrimus* occurred in highest densities in small sunny openings with some soil development.

Remnants of a uniform older-aged cohort is scattered throughout the RNA, but is particularly evident on the upper NW-facing slopes in sec. 1 (photo 7). These trees average about 210 years in age, ca. 30-36 inches dbh (76-91 cm) and about 130-150 ft. 40-46 m) in height. compared to the 140 year cohort, this cohort has trees with much longer, cleaner boles and, in most cases, foliage limited to the upper 1/3 of the tree. There is some stem breakage in this cohort and a higher percentage of recent death due to drought-related disease than in the younger cohort.

Ages of trees larger than 39 inches (99 cm) dbh were ascertained from cut stems associated with several clearcut operations adjacent to the RNA along the southeastern border. Table 5 lists four trees which were aged in this manner.

Table 4: Average herb and shrub cover and frequency on thirty-five 100 m^2 plots in red fir forest, Mountaineer Creek Candidate RNA.

species	frequency	mean % cover
Dentaria pachystigma	0.25	1.37
Hackelia sp.	0.25	1.17
Chrysolepis sempervirens	0.06	0.91
Draperia systyla	0.26	0.51
Collinsia torreyi	0.31	0.40
Pedicularis semibarbata	0.46	0.29
Ribes viscossimum	0.06	0.17
Chrysopsis breweri	0.20	0.11
Lupinus andersonii	0.11	0.11
Allium campanulatum	0.06	0.09
Hydrophyllum occidentale	0.03	0.09
Arabis hirsuta glabrata	0.14	0.06
Calystegia fulcratus barryi	0.03	0.06
Senecio integerrimus	0.11	0.03
Ribes cereum	0.03	0.03
Monardella odoratissima pallida	0.09	0.03
Hesperochloa kingii	0.03	0.03
Viola purpurea	0.14	-
Angelica lineariloba	0.03	-
Arabis platysperma	0.03	-
Corallorhiza maculata	0.03	-
Phacelia ramosissima	0.03	-
Prunus emarginata	0.03	-
Pyrola picta	0.06	-
Silene sp.	0.03	-
unidentified herb	0.03	-
	total average cover	5.49

Table 5: Size and ages of mature red fir sampled between 8400 and 8700 ft. on northeast-facing ridgetop, Mountaineer Creek RNA.

age (# growth rings)	diameter (inches)	sampling height (inches from base)
185	42	24
180	55	12
212	61	30
261	72	21

From this small sample it appears that growth rates have been fairly constant for these trees on a gently-sloping ridge-top. These large trees typically show some evidence of fire charring at the base, although well-developed cat-face scars are very rare and only occur on the oldest trees.

The sampling period was in the midst of a severe drought with below normal precipitation for four years. Recent tree death was widespread, but not as high in frequency as other red fir areas seen further north in the Sierra (e.g., Clark Fork RNA, Keeler-Wolf 1991). Frequency of recent (last three years) tree death averaged between 0.25 and 4%. The proximate cause of most recent death was infestations of fir engraver beetles (*Scolytus ventralis*). Dwarf mistletoe (*Arceuthobium campylopodium*) was noted in some young stands, but nowhere was seen in epidemic proportions. No true mistletoe (*Phoradendron bolllianum* ssp. *pauciflorum*) was noted. In general both types of mistletoe are most problematic in old growth, uneven-aged fir stands and are in low frequency in young, even-aged stands as at MCRNA (Laacke and Fiske 1983).

Upper Montane Mixed Coniferous Forest (85200):
This relatively open forest characteristic of southeast-facing slopes is basally dominated by large, scattered sugar pine (*Pinus lambertiana*) and numerically dominated by white fir. Jeffrey pine (*Pinus jeffreyi*) becomes a co-dominant in the more xeric rocky sections and red fir is scattered, being most common on the upper slopes adjacent to continuous red fir stands on northerly exposures, and the lower slopes adjacent to the creek bottom. This forest has an open canopy averaging about 40% crown cover. The understory is dominated by patches of mountain chaparral shrubs such as *Chrysolepis sempervirens, Prunus emarginata,*

Ceanothus cordulatus, and *Arctostaphylos patula* (photo 8). Lowest elevation rocky sites on metamorphics at the eastern end of the RNA are co-dominated by Jeffrey pine and white fir with *Ceanothus pinetorum, Eriogonum wrightii* var. *subscaposum,* and *Arctostaphylos patula* the major shrubs. California black oak (*Quercus kelloggii*) occurs as scattered shrubby individuals in this area along with herbs and grasses such as *Pterixia terebinthina, Melica stricta, Erigeron foliosus,* and *Bromus richardsonii*.

A transect was run down an ESE-facing slope from the 8000 ft. (2438 m) ridgecrest to a point ca. 100 m above the creek level at ca. 7300 ft. (2225 m) in the SE 1/4, SE1/4 sec. 36. The density of trees is essentially the same as the average density for the red fir plots, however basal area cover is substantially higher (Table 6). Structurally and demographically, this mixed coniferous forest differs from the red fir forest by having a higher percentage of large, old trees which contribute substantially to the basal area. There are also a large number of young (<100 years) poles and saplings of white fir, which account for the relatively high total density of stems.

Crown fire was not as widespread in this forest type as in the red fir forest. Most old dominants showed evidence of repeated ground fire (photo 9). The open nature of the canopy has allowed continual regeneration of saplings throughout much of the forest. Only recently (perhaps in the past 40 years) has reproduction become limited by shading of the understory and by a paucity of un-rocky germination sites. A number of the younger fir in the forest are between 40 and 50 years old. These trees average about 12 inches (31 cm) dbh and about 60 ft. (18 m) tall. The largest sugar pine (up to 90 inches, 2.3 m dbh and 170 ft. tall) may be over 600 years old and the largest white fir (up to 70 inches, 1.8 m dbh) is at least 400 years old.

Ground cover is substantially higher than in the red fir forest, averaging 18.5% (Table 7). Despite the smaller sample area, species number is higher (29 vs. 26) in this sample than in the red fir forest sample.

Table 6: Summarized results of vegetation sampling for trees on ten 10 x 10 m plots on ESE-facing upper elevation mixed coniferous forest, Mountaineer Creek Candidate RNA.

species	density (per ha)	frequency (%)	cover (m^2/ha)	rel dens.	rel freq.	rel. cov.	imp. value
white fir	420	90	65.0	0.618	0.392	0.378	138.8
sugar pine	140	70	87.7	0.205	0.304	0.510	101.9
red fir	70	40	4.1	0.103	0.174	0.024	30.1
Jeffrey pine	50	30	15.2	0.074	0.130	0.089	29.2
totals	680	230	172.0	1.000	1.000	1.000	300.0

Table 7: Average herb and shrub cover and frequency on ten 100 m^2 plots in upper montane mixed coniferous forest, Mountaineer Creek Candidate RNA.

species	frequency	mean % cover
Chrysolepis sempervirens	0.8	6.8
Prunus emarginata	0.4	4.4
Ceanothus cordulatus	0.4	3.6
Arctostaphylos patula	0.4	1.7
Osmorhiza chilensis	0.2	1.0
Lupinus andersonii	0.2	0.3
Phacelia ramosissima	0.1	0.2
Ribes roezlii	0.5	0.1
Hieracium horridum	0.4	0.1
Symphoricarpos acutus	0.2	0.1
Bromus richardsonii	0.3	0.1
Chrysopsis breweri	0.1	0.1
Pyrola picta	0.3	-
Arabis hirsuta glabrata	0.2	-
Galium bolanderi	0.2	-
Rhamnus californicus	0.2	-
Agoseris sp.	0.1	-
Apocynum pumilum	0.1	-
Commandra pallida	0.1	-
Collinsia torreyi	0.1	-
Corallorhiza maculata	0.1	-
Cryptantha sp.	0.1	-
Mimulus whitneyi	0.1	-
Pedicularis semibarbata	0.1	-
Penstemon laetus	0.1	-
Phacelia eisenii	0.1	-
Phacelia mutabilis	0.1	-
Pterospora andromedea	0.1	-
Silene sp.	0.1	-
	total mean	18.5

In addition to the listed understory species in table 7, other plants such as *Zigadenus exaltatus, Delphinium pratense,* and *Nemophila pedunculata* also appear to be largely restricted to this forest.

This forest type gives way to mountain chaparral along the rocky summit of the northern boundary ridge. Its relationship to this community can be seen from the dominance of the understory by mountain chaparral species (see discussion of mountain chaparral).

Similar associations dominated by sugar pine, white fir, Jeffrey pine and with or without red fir occur on more xeric sites in intermediate positions between white fir, mixed conifer, and red fir dominated forests throughout the northern and southern Sierra and also in the southern California mountains (e.g., Hall Canyon, Keeler-Wolf 1886). Compared to sites such as Clark Fork (Keeler-Wolf 1991a), this forest occurs on a southeast to east-facing exposure rather than a southwest to west exposure. It also lacks incense-cedar. Jeffrey pine is more ubiquitous and dominant than sugar pine at Clark Fork, but the opposite is true at Mountaineer Creek. The understory is similarly dominated by mountain chaparral shrubs with *Chrysolepis sempervirens* as one of the major species. However, *Arctostaphylos patula* and *Ceanothus pinetorum* are absent at Clark Fork and *A. nevadensis* and *Quercus vaccinifolia* are absent from Mountaineer Creek. Teakettle Creek on the Sierra National Forest (Griffin 1975) also has an analogous upper elevation mixed conifer forest. As at Mountaineer Creek, the forest is more uneven-aged than the adjacent red and white fir forests, indicating its propensity for carrying ground fires (photo 10).

These types of mixed conifer forest, dominated by sugar pine and white fir but mixed with Jeffrey pine and red fir, occupy drier, warmer sites than adjacent red fir and white fir forest. They typically occur on steep, rocky slopes in generally xeric exposures. They are distinct from the typical lower elevation Sierran mixed coniferous forest (Holland 84230) by the low importance or absence of ponderosa pine (*Pinus ponderosa*) and incense-cedar.

<u>White Fir Forest (84240):</u>
This association, characterized by strong dominance in basal area and density by white fir, is limited to the lower elevation northwest

exposures at the northeastern side of the RNA. No sampling was conducted in this forest type. In general, the physiognomy of this forest is very similar to the red fir forest (photo 11). Most of it was also affected by crown fire 140 years ago and the uniformity and stature of the white fir mirror the same characters of the red fir forest of the same age. Understory is sparse except adjacent to rocky areas where a mixture of mountain chaparral shrubs and herbaceous vegetation occurs (photo 12). Herbs of these openings have some overlap with those of similar openings in the red fir forest, but also reflect the somewhat warmer and drier conditions prevalent in the white fir zone. Such species as *Sanicula crassicaulis, Melica stricta, Stipa columbiana, Crepis occidentalis, Galium bolanderi, Gayophytum diffusum* ssp. *parviflorum, Cryptantha simulans, Allophyllum violaceum, Cirsium* sp., *Eriogonum spergulinum* var. *pratense* and *Orochaenactis thysanocarpha* are frequent in these sunny, rocky openings. A few other species more typical of semi-shade also appear most abundantly in the white fir forest. These include *Hieracium albiflorum, Habenaria unalascensis,* and *Osmorhiza chilensis*.

As with the red fir forest, there are some larger survivor trees. These attain diameters up to 76 inches (193 cm). Trees larger than 48 inches (123 cm) dbh are generally survivors and often carry light singe marks at the base of the stem, indicating their past subjection to surface fire.

Other trees associated with the white fir forest include sugar pine, Jeffrey pine, and red fir. The latter species overlaps and intermixes with white fir forest at both the upper elevation limits of the forest (ca. 7400-7800 ft.) and the lower limits of it along the creek (6900-7200 ft). Thus, the zone of pure white fir occupies a vertical distribution of only about 200-300 ft. (61-91 m) in this RNA.

Wet Meadow (45100):

The most well developed meadow complex occurs between ca. 8300 and 8600 ft. (2530-2621 m). This is a classic hanging meadow with several cold snow-melt fed springs rising and feeding a broad sloping meadow with interfingerings of red fir and lodgepole pine. The saturated soil and some slope instability in the past have created several small level slumpage areas with boggy pools of open water (photo 13). The early summer aspect of this meadow complex has a shady border of forest on the margin of which grow *Ledum glandulosum* var. *californicum, Pyrola*

secunda, Mitella breweri, and other shade-tolerant hydrophiles. In the semishade adjacent to the meadow border is a zone of seasonally saturated soil dominated by *Caltha howellii* (photo 14). Moving further into the permanently wet zones, *Carex nebrascensis, Heleocharis sp., Aster alpigenus ssp. andersonii, Pedicularis groenlandica,* and *Hypericum anagalloides* tend to dominate gradually sloping wet areas, often with a quaking substrate, high in organics. Surrounding the few small boggy pools are species such as *Calamagrostis canadensis, Mimulus primuloides, Allium validum,* and *Carex eurycarpa*. Below the gently sloping areas lining the rivulets draining these meadows occur species such as *Salix drummondiana* var. *subcaerulea, Corydalis caseana, Oxypolis occidentalis, Polygonum bistortoides, Lupinus polyphyllus* ssp. *supurbus, Viola macloskeyi, Dodecatheon alpinum, Saxifraga punctata* ssp. *arguta,* and *Carex kelloggii*. The broad areas of permanently moist, but not saturated soils adjacent to these rivulets have *Veratrum californicum, Ligusticum grayi, Ranunculus alismaefolius* var. *alismellus, Erigeron peregrinus,* and *Penstemon heterodoxus* (photo 15).

Several other hanging meadows occur at lower elevations in the drainage. These have a similar association of species. One of the best developed of these occurs at the junction of South Mountaineer Creek and the small tributary in the NW 1/4 NW 1/4 Sec. 1.

Another type of meadow forms narrow stringers only a few yards wide along the creek. This lotic meadow association includes a number of the species mentioned above, which line the rivulets. However, other species common only in this habitat include, *Arnica longifolia* ssp. *myriadenia, Athyrium felix-femina, Cardamine breweri, Carex fracta, Carex jonesii, Carex ormantha, Castilleja miniata, Epilobium angustifolium, E. brevistylum, Galium trifidum* var. *pusillum, Habenaria sparsiflora, Helenium bigelovei, Lilium kelleyanum, L. parvum, Mertensia ciliata, Mimulus guttatus, M. lewisii, Nasturtium officinale, Orobanche uniflora, Saxifraga nidifica, S. oregana, Sidalcea oregana* ssp. *spicata, Stachys albens,* and *Veronica serpyllifolia* var. *humifusa* (photo 16).

Montane riparian scrub (Holland 63500) vegetation is not well-developed in the RNA, but does occur as scattered small stands (too small to map) along the creek. It is dominated by several shrubby willows including

Salix caudata var. bryantina, S. pseudocordata, and *S. scouleriana.* Other shrubs include *Cornus stolonifera, Lonicera involucrata, Sorbus californicus,* and *Sambucus microbotrys.*

Lodgepole Pine Forest (86100):

Lodgepole pine is restricted to mesic-to-hydric situations with cold air drainage in the MCRNA. The most extensive stand is associated with the north-facing basin at the head of the drainage in the SW 1/4 sec. 11. Here lodgepole pine forms a variable cover. It is marginally dominant in an open, rocky forest with much western white pine and red fir (photo 17). The largest portion of the lodgepole forest is of this type. There is no permanent water, but the soil remains moist through part of the growing season from late snowmelt. Understory species include *Juncus parryi, Antennaria rosea, Draba cruciata, Chrysopsis breweri, Dentaria pachystigma, Allium campanulatum, Senecio integerrimus,* and *Poa fendleriana*. A number of lodgepole pines in this mixed forest are diseased, and many have recently died, despite the relatively mesic conditions.

Moving down-slope further into the drainage, the forest becomes denser and the understory becomes more lush with small rivulets and stringer meadows appearing at about the 8700 ft. (2652 m) level. Canopy closure increases to over 50% and large lodgepole pine up to 48 inches (122 cm) dbh occur intermixed with western white pine and an increasing number of red fir. Understory species in this portion of lodgepole pine forest include species such as *Ligusticum grayi, Erigeron peregrinus, Veratrum californicum, Pyrola secunda,* and *Mitella breweri*. Lodgepole pine continues to marginally dominate the forest to the southern margins of the main meadow complex.

Lodgepole pine also locally dominates along the lower stretches of South Mountaineer Creek (see photo 5). These stands are typically surrounded by red fir forest and are too small to accurately depict on the vegetation map. They form a narrow discontinuous border immediately adjacent to the stream where soil moisture is high and cold air flow prevails. Lodgepole pine is largely absent from the creekside between ca. 7200 ft and 8300 ft. (2195-2530 m), possibly because of the steeper slopes of the canyon and the shallow, excessively well-drained, rocky soil in this area.

Western White Pine Forest (no Holland Equivalent):
This open forest dominates the highest elevations of the area on northwest to northeast facing exposures. High snowfall, cold temperatures, and rocky substrate appear to be the major environmental requirements for this association (photo 18). It is strongly dominated by western white pine, with red fir the major associate. Lodgepole pine is a minor associate at the head of the basin in the NW 1/4 sec. 14. The canopy of this forest is relatively open, averaging between 25 and 45% cover. The understory is rocky with occasional small patches of *Chrysolepis sempervirens,* but herbs dominate for the most part. These include *Draba cruciata, Juncus parryi, Cryptogramma acrostichoides, Linanthus oblanceolatus, Dicentra uniflora, Pellaea breweri, Allium obtusatum, Carex rossii, Hackelia mundula, Penstemon caesius, Monardella odoratissima ssp. pallida, Fritillaria pinetorum,* and *Chrysopsis breweri*.

The western white pines in this association may attain large size and are presumed to be the oldest trees in this RNA. One massive specimen (possibly two fused individuals) at 9200 ft. measured 8 ft. (2.43 m) dbh (photo 19). Trees are often clumped in lines adjacent to open patches of ground along the north-facing slopes suggesting that snow accumulation restricts germination sites (photo 20). Most mature trees are relatively short (average canopy height, ca 60 ft., 18.2 m).

Little ecological information has been published on subalpine western white pine associations in the Sierra Nevada, although it is evident that an irregular zone of dominance by this species exists in many places in the Sierra (Talley 1977, Keeler-Wolf 1990, Don Potter Southern Sierra Zone Ecologist, pers. comm 1990).

Montane Chaparral (37510):
This association is closely tied to xeric, rocky substrates in the RNA. Immediately following crown fire it is undoubtedly much more widespread, but over a period of several decades, becomes shaded out and succeeded by red fir. Currently there are only a few small areas of montane chaparral in the area (photo 21). These are typically co-dominated by several shrubs including *Arctostaphylos patula, A. nevadensis, Ceanothus cordulatus, Holodiscus microphyllus, Prunus emarginata, Chrysolepis sempervirens, Rhamnus californicus,* and *Ribes*

roezlii. The stands of shrubs are typically open and separated by rocky soil or granitic outcrops among which grow herbaceous species such as *Senecio integerrimus, Comandra pallida, Phacelia eisenii, Arenaria congesta, Mimulus whitneyi, Phlox diffusa, Eriogonum nudum, Pteryxia terebinthina,* and *Erigeron foliosus*. The largest patch occurs on the upper south-facing slope of the northern boundary ridge. In addition to its rocky substrate this site may also have much of its snow cover blown off during the winter, thus limiting the establishment of trees.

FAUNA

The fauna of the MCRNA is typical for the southern montane zone of the Sierra. A list of all species noted during the survey is presented in appendix 2. The endemic Little Kern golden trout has already been discussed. Other interesting aspects of the local fauna include possibly the southernmost location of pikas (*Ochotona princeps*) in the Sierra. A small colony of these mammals was noted in talus at the very head of the drainage in a very open western white pine forest. Previously (Keeler- Wolf 1989) I believed the colony on the eastern slopes of Moses Mountain to be the southernmost in the Range. Black bear (*Ursus americanus*) are common in the area with numerous fresh sign (including wallows in meadows, tracks, and scat) noted throughout.

In order to assess the wildlife value of the even aged 140 year old red fir forest a breeding bird census was conducted. This was run along the trail 31E14 between the wilderness area boundary and the creek crossing in the SW 1/4, SW 1/4 sec. 2. All birds noted in a strip 1 km long and 100 m wide were counted. The census began at 6:50 AM on June 22 and ended at 7:39. Table 8 presents the results. The high number of seed-eating birds such as red crossbills and pine siskins was indicative of the large number of red fir cones still present in the forest at this time of year. The relatively high numbers of insectivorous species such as yellow-rumped warblers and golden crowned kinglets indicated a fairly high density of insects in the foliage. As a result of the youth of the forest and the low numbers of dead trees, the bark-gleaning and bark -drilling guilds represented by red-breasted nuthatch, and white-headed woodpecker, respectively was lower in density than in some other more mature Sierran coniferous forests (e.g. Big Pine Mountain, Keeler-Wolf 1991b).

Table 8: Densities of birds (per 10 ha) counted on a transect in northwest-facing even aged red fir forest, June 22, 1990, Mountaineer Creek candidate RNA.

species	number of individuals
Red crossbill	34
Yellow-rumped warbler	14
Pine siskin	10
Golden-crowned kinglet	6
Red-breasted nuthatch	5
Dark-eyed junco	5
Hermit thrush	4
Townsend's solitaire	4
Mountain chickadee	3
Dusky flycatcher	2
Western tanager	2
Steller's jay	2
Cassin's finch	1
American robin	1
Hermit warbler	1
Hammond's flycatcher	1
Western wood pewee	1
White-headed woodpecker	1
total	97

AQUATIC AND WATERSHED VALUES

Aside from the previously discussed Little Kern golden trout, the MCRNA contains several other values associated with its aquatic resources. The Creek supports a variety of aquatic invertebrates including several species of caddisflies, stoneflies, blackflies, flatworms, and dragonflies. Mountain yellow-legged frogs also were seen in and along the creek. A small ephemeral pond (photo 22) lies on the crest of the ridge in the NW 1/4 SW 1/4 sec. 11. This pond contains several additional taxa of aquatic invertebrates such as water boatmen and backswimmers, not seen elsewhere in the drainage.

The inclusion of the entire drainage of South Mountaineer Creek in the RNA will be valuable from the aspect of watershed-related studies. Comparative study of this unlogged and unroaded watershed and the adjacent similar sized and shaped North Fork Clicks Creek watershed, which has been roaded and logged, presents a number of possibilities for understanding the effects of managed watersheds on various resources.

GEOLOGY

The MCRNA is underlain by a portion of the huge Sierra Nevada Batholith, which is composed of Mesozoic granitic rocks (Jennings et al. 1977). Granitic rock occurs as small outcrops throughout the area. It is broken into talus in several areas at the head of the drainage and on the upper slopes. There are no large monolithic outcrops in the drainage. Throughout the majority of its length South Mountaineer Creek flows over bedrock with few large boulders (photo 23). The regular fracturing and jointing of the granitic bedrock is manifested by numerous low stair-step cascades along the creek.

A second rock type present in the RNA is pre-Cenozoic metasedimentary rock (Jennings et al. 1977). This rock is primarily schistose with a fair amount of mica visible in most outcrops. The color is typically rusty brown and foliations of from 1-2 inches thick are frequently detectable. The age of these metasediments is debatable . However, some of these rocks are likely to be Paleozoic (Schweickert 1981). These rocks have been considered as part of the Calaveras Formation by many authors, but this term has been so broadly applied as to afford little specificity (Schweickert

1981). These metasediments are conspicuous in small outcrops on the upper slopes on the NE side of the drainage and in the creekbeds near the junction of South Mountaineer and Mountaineer creeks (photo 24).

SOIL

The order 3 soil survey map for the area (Sequoia National Forest 1980) shows five mapping units. These are shown on map 4 with brief descriptions to follow.

One of the two principal mapping units in the MCRNA is Cannell-Kriest family, - Rock outcrop complex, 30-50% slopes. This occurs on NW-facing slopes throughout the lower 2/3 of the drainage. It is about 55% Cannell soils, 20% Kriest family soils and 15% rock outcrop, with 10% inclusions of other soils such as Toem. The Cannell soil is deep and well drained, formed from granitic rock. The surface layer is brown sandy loam ca. 18 cm thick, the subsoil is yellowish brown sandy loam ca. 51 cm thick. The substratum is yellowish brown sandy loam about 58 cm thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam. The Kriest family soil is moderately deep and well drained, also formed from granitic rock. Surface layer is typically grayish brown sandy loam about 13 cm thick. Subsoil is pale brown sandy loam about 69 cm thick over highly weathered granitic rock. In some areas the surface layer is coarse sandy loam. This mapping unit has an estimated culmination mean annual increment of 7.3 to 9.3 cubic meters/ha for red fir and 6.4 to 11.4 cubic meters/ha for white fir. It is thus considered well suited for the production of these two species.

The other extensive mapping unit is the Cannell-Sirretta-Nanny family complex, 30-50% slopes. This unit occupies virtually all of the E and SE-facing exposures in the MCRNA. It is composed of 35% Cannell, 25% Sirretta, and 20% Nanny family soils. There are small areas of rock outcrop, Toem, Cagwin, Monache, and Monache Variant, drained soils included. The Cannell soil has been previously described. The Sirretta soil is moderately deep and excessively well drained. It is also formed from granitic rock. This soil is 35-90 percent gravel and cobbles. The surface layer is typically dark grayish brown gravelly coarse sandy loam ca. 15 cm thick. The substratum is brown and light yellowish brown extremely cobbly loamy sand about 56 cm thick over fractured hard granitic rock. The Nanny family soil is deep and well-drained. It is granitically derived. This soil is 35-80%

gravel and cobbles. The surface layer is very dark grayish brown stony sandy loam ca. 15 cm thick. The subsoil is brown and pale brown sandy loam sand extremely fine sandy loam ca. 59 cm thick. The substratum is yellowish brown loamy fine sand and very gravelly loamy fine sand ca. 116 cm thick over highly weathered granitic rock.

On the NE side of the RNA, a small area of the mapping unit known as Dome-Chaix-Rock outcrop association, steep occurs. Although the soils in this mapping unit are considered to be derived from granitic parent material, the local representation appears to be underlain by metamorphic rock. Hence, there is some indication that this mapping unit is incorrectly assigned. Virtually all of the area shown as part of this mapping unit is dominated by very shallow rocky soil or outcrop and is dominated by montane chaparral and rock outcrop species.

The Rock outcrop- Toem complex, 30-50% slopes occurs at the head of the drainage at highest elevations. Locally it is vegetated with western white pine and open lodgepole and red fir forest. This unit is 60% Rock outcrop and 30% Toem soils. Included in this unit are small areas of Cagwin soils. Rock outcrop in the RNA occurs as isolated outcroppings of granitic rock. Runoff is very rapid. The Toem soil is shallow and excessively well-drained. Typically the surface layer is dark grayish brown loamy sand ca. 8 cm thick. The subsoil is brown loamy sand about 40 cm thick over highly weathered granitic rock.

The final mapping unit shown in the area is Rock outcrop. It is mapped at the head of the drainage and also in the area of montane chaparral in the nw 1/4 sec. 2. This outcrop is all derived from granitic rock, however some outcrops (not shown on the map) in the NE portion of the RNA are metamorphic.

IMPACTS

Over 90% of the area is in the Golden Trout Wilderness. The boundary in this area has remained unchanged since the Wilderness Area was established in 1964. The Summit Trailhead at the southern edge of the RNA acts as the main portal of disturbance. Despite its regular use throughout the summer and early fall this trail has little impact on the candidate RNA beyond a few yards to either side of the trail.

During my stay in the area from June 19 to 22, 1990 a total of nine cars were parked at the trailhead. The majority of these were on official business including: four California Department of Fish and Game vehicles, a Forest Service vehicle, and my own. Three cars transported recreational users. Of these, only one party of three people spent more than just transit time in the candidate area. This party camped one night at an established site at the trail crossing of the South Mountaineer Creek. A few other less well used campsites exist near the crossing and one site with a iron fireplace top is directly across the creek from the section corner of 35, 36, 1, and 2. This latter side has not been regularly used since the trail 31E20 was not maintained. Aside from these campsites, very little recreational impact was noted in the MCRNA. The gentle grade of the trail 31E14 and recreational draw of the subalpine lakes only five miles from the trailhead and the alpine country beyond encourages quick passage through the South Mountaineer Creek drainage. Horses and mules from the Golden Trout Packers concession occasionally stray off the trail in the area, but none of the meadows near the trail was noticeably impacted. The largest most complex wet meadows showed no noticeable impact except for bear wallowing. A few pieces of litter were seen along 31E14 and some yellow Forest Service flagging was noted at the head of the drainage (perhaps marking the Wilderness boundary).

The clearcut blocks bordering the southeastern side of the RNA were cut over a period of the past 15 to 20 years. In general, they do not affect the South Mountaineer Creek drainage. However, a few of the blocks have entered a few yards into the drainage (the logging was selective at the sites within the drainage). Many of the cuts have been planted with Jeffrey pine, now between 5 and 15 years old. However, no plantation trees were seen within the drainage of South Mountaineer Creek. All effects of the logging became unnoticeable within ca. 50 yards (46 m) of the ridgecrests.

MANAGEMENT CONCERNS

Camping in the RNA is the only real concern. With the obliteration of the few sites near the trail and the discouraging of camping within the South Mountaineer Creek drainage, the principal human impacts in the area will be assuaged. The effects of the logging on the southeastern boundary are minor and I suggest maintaining the RNA boundary at the ridgecrest, rather than withdrawing some regular distance from the crest, so that future protection

of the entire drainage can be assured. The forests of the RNA will not require controlled fire, but should be allowed to burn when the next fire comes.

BOUNDARY CHANGES

Map 2 indicates the small (153 acre, 61.9 ha) addition at the southern end of the drainage. This addition is important to the ecological integrity of the RNA. It encompasses the upper portion of the drainage where the main source of the South Mountaineer Creek rises in the best-developed wet meadow complex in the drainage. It also includes important transitional forests of red fir, western white pine, and lodgepole pine otherwise absent from the drainage. It also contains the only population of the Mineral King Draba in the RNA. It is unclear to me why this small lobe of the South Mountaineer Creek drainage was excluded when the Golden Trout Wilderness boundary was drawn. There is little timber value in this area and there is no noticeable human impact in this high, rocky shallow basin.

RECOMMENDATIONS

I strongly recommend the establishment of the Mountaineer Creek RNA. As a representative of the southern Sierra red fir forest type it is excellent. The other additional values of the wet meadows, aquatic values, and rare plants strengthen its importance. The area is highly accessible and its recreational use is relatively low in a region of high recreational impact.

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Captions for Photographs Accompanying
Ecological Survey of Mountaineer Creek RNA

Photo 1: *Corydalis caseana* ; an early flowering individual along the lower reaches of South Mountaineer Creek, ca. 7200 ft.

Photo 2: *Corydalis caseana* ; young basal leaves emerging from perennial rootstalk along snowmelt rivulet ca. 8600 ft., at head of South Mountaineer Creek.

Photo 3: The Mineral King Draba in flower on rocky north slope, ca. 9100 ft.

Photo 4: Hanging meadow along mid-portion of South Mountaineer Creek. Note clump of older red fir adjacent to meadow, surrounded by young even-aged forest.

Photo 5: South Mountaineer Creek, ca. 7000 ft. with small clumps of lodgepole pine intermixed with creekside red fir forest. Note paucity of woody riparian growth along creek.

Photo 6: Typical understory of closed even-aged (140 yr.) red fir forest, ca 8300 ft. NE exposure. Note absence of reproduction and herb and shrub layer.

Photo 7: An even-aged stand of ca. 210 year old red fir on a NW-facing slope. Note long clean boles and relatively small apical tufts of branches.

Photo 8: Upper montane mixed conifer forest with sugar pine, white fir and Jeffrey pine. Understory dominated by *Chrysolepis sempervirens* .

Photo 9: Upper montane mixed conifer forest; ancient sugar pine (ca. 85 inches dbh) with a fire scar. White fir to left is ca 24 inches dbh.

Photo 10: Looking west from the northeastern corner of the drainage. Note tall, uneven aged canopy of mixed coniferous forest on right contrasting with even aged (140 year) canopy of red fir (and in foreground, white fir) prevalent throughout rest of area.

Photo 11: Interior of white fir forest ca. 7500 ft. on NW-facing exposure.

Photo 12: Rocky ridgetop clearing in white fir forest, ca 7400 ft. The

majority of understory herbs of the white fir forest are associated with such openings.

Photo 13: Boggy pool, ca. 8600 ft. in large meadow complex at head of S Mountaineer Creek. This level stretch may have been caused by slope failure and the pool may be kept open by bear wallowing.

Photo 14: *Caltha howellii*, the characteristic early summer dominant of wet meadow edges.

Photo 15: Gently sloping wet meadow dominated by *Veratrum californicum,* ca 8500 ft. at head of South Mountaineer Creek.

Photo 16: Detail of wet streamside meadow along lower reaches of South Mountaineer Creek. *Orobanche uniflora* is the purple flower, parasitic on *Saxifraga nidifica* (silvery basal leaves).

Photo 17: Open forest dominated by lodgepole pine, western white pine and red fir at head of South Mountaineer Creek drainage, ca. 9000 ft. Coyote Peaks in distance.

Photo 18: Open western white pine forest on steep north-facing slope ca. 9100-9200 ft.

Photo 19: An ancient 8 ft. dbh western white pine at 9200 ft. on southern boundary ridge.

Photo 20: A line of western white pine adjacent to opening maintained by late snowmelt, north-facing slope ca. 9150 ft.

Photo 21: Montane chaparral dominated by *Arctostaphylos nevadensis* on SE-facing exposure along northern boundary ridge.

Photo 22: Ephemeral pond, ca 2 ft. deep along broad ridge crest ca 8640 ft., mature red fir forest behind.

Photo 23: South Mountaineer Creek flowing over jointed granitic rock, ca. 7600 ft.

Photo 24: Main fork of Mountaineer Creek at NE tip of RNA, flowing over metamorphic rock.

Appendix 1
Mountaineer Creek Vascular Plant List
ca. 220 taxa

This list include all species detected during the four day ecological survey June 19-22, 1990. Abbreviations refer to habitat types as follows:
rf.....red fir forest
wf.....white fir forest
mcf.....upper montane mixed coniferous forest
mc.....mountain chaparral
wwp.....western white pine forest
lp.....lodgepole pine forest

Abies concolor var. *loweana* ; common below 8300 ft. on open se and e facing slopes and below 7600 ft on n slopes
Abies magnifica var. *shastensis* ; the dominant tree of the RNA 6900-9236 ft. most appear to have bracts exserted ca 5 mm.
Achillea millefolium ; moist mdw edges, etc throufhout
Aconitum columbianum ; occas along crek in seepy areas
Agoseris retrorsa ; rocky ridges up to 8200 ft.
Allium campanulatum ; common to locally abundant in open rf up to 9000 ft.
Allium obtusatum ; greenish-white w/ purple midribs, common only upper ridges in semi-shade of solitary rf, wwp 8600-8800 ft.
Allium validum ; wet mdws 7800-8600 ft.
Allophyllum violaceum ; sunny opeinings in rf and wf <7600 ft.
Amelanchier pallida ; occas lower wf, rf near crek
Angelica lineariloba ; variable in habitat and habit; fine-leafed plants on talus on n slopes and broader leaved plants along moist to wet streamsides 7000-8600 ft.
Antennaria rosea ; fairly common moist gravel and semi-shade along lower creek
Apocynum pumilum ; occas lower dry forest mcf
Aquilegia formosa ; occas along creek
Arabis glabra ; occas. openings in rf
Arabis hirsuta var. *glabrata* ; common in semi-shade of rf 7200-8600 ft.
Arabis platysperma ?; most before flowering, many have rust disease on upper cauline leaves deforming and yellowing them, rocky opeings rf, common
Arabis sp.; purple flrs, larger habit than previous stellate pubescense only at leaf margins
Arceuthobium campylopodium : on rf and wf
Arctostaphylos nevadensis ; mc rocky openings in rf
Arctostaphylos patula ; common mc
Arenaria congesta var. *suffrutescens* ; rocky ridges 7500-8800 ft. near S limits
Arnica longifolia ssp. *myriadenia* ; common wet creek margins
Artemisia douglasiana ; occas along lower creek

Artemisia dracunculus ; occas along lower creek in gravelly areas
Aster alpigenus ssp. *andersonii* ; occas. in wet mdws. 7200-8600 ft.
Astragalus bolanderi ; upper slope opeings in rf. wwp, ca 9000-9236 ft. may be S limits
Athyrium felix-femina ; common along creek
Bromus richardsonii ; occas. openings rf
Calamagrostis canadensis ; wet mdw 8600 ft.
Calocedrus decurrens ; rare in area on s slopes
Calochortus minimus ; moist meadow edges along creek ca. 7000-8200 ft. near S limits
Caltha howellii ; abundant in wet meadows and streamsides throughout, early flowering
Calyptridium umbellatum ; occas. dry openings rf
Calystegia fulcratus var. *barryi* ; open ridges and clear-cuts 7000-8200 ft.
Cardamine breweri ; occas along creek
Cardamine (Dentaria) pachystigma ; very common in shade or semi-shade of rf 7000-9000 ft.
Carex eurycarpa ?; not in full fruit, similar to *C. nebrascensis,* wet mdws. 8600 ft.
Carex fracta ; fairly common, boggy mdws, and wet streamsides 7200-8600 ft.
Carex jonesii ; fairly commopn along stream and in meadow edges 7000-8000 ft.
Carex kelloggii ; occas wet mdws, along creek 7200-8100 ft.
Carex nebrascensis ; wet mdws and along creek 7200-8600 ft,
Carex ormantha; banks of stream throughout
Carex rossii ; occas., rocky ridges and slopes <9000 ft.
Castilleja applegatei ; occas rocky opeings rf
Castilleja miniata; occas along creek
Ceanothus cordulatus ; mc, rocky areas, clear-cuts
Ceanothus pinetorum ; oncommon on dry se slopes lower elevs.
Cheilanthes gracillima ; occas metamorphic outcrops <7500 ft.
Chrysolepis sempervirens ; fairly common in talus and rocky openings in rf
Chrysopsis breweri ; common in open rf throughout
Chrysothamnus parryi ssp. *vulcanicus* ; occas., metamorphic rocky ridges ca 7500 ft.
Cirsium sp.; not in flr. rocky ridges 7500 ft.
Collinsia parvifolia ; moist banks above creek 7000-7500 ft.
Collinsia torreyi; abundant in small openings in rf 7000-9000 ft.
Collinsia torreyi var. *wrightii* ; with previous taxon
Collomia linearis ; occas. sunny opeings and rocky ridges ca 7500 ft.
Commandra pallida ; occas. in rocky areas mc
Compositae sp.; rare on n facing slope in rf, Inulae tribe?
Corallorhiza maculata ; occas. duff rf
Cornus stolonifera ; occas along creek
Corydalis caseana var. *caseana* ; common wet mdws and creeksides, a rare taxon throughout its California range, s limit along stream ca. 0.5 mi. e of Jordan Pk lookout (J. Shevock, pers. comm)
Crepis occidentalis ssp. *pumila* ; occas. rocky ridges 7000-8800 ft.
Cryptantha simulans ; lower sloeps of e boundary ridge on metamorphics 7200-7400 ft
Cryptogramma acrostichoides ; n-facing rocky slopes rf, wwp 8600-9100 ft.

Cystopteris fragilis ; wet rocky sites along creek and meadows throughout
Delphinium pratense ; fairly common openings on s slopes and on higher n slopes in rf endemic to s Sierra
Dicentra nevadensis ; uncommon moist rf
Dicentra uniflora ; occas rocky opeinings rf
Dodecatheon alpinum ssp. *majus* ; common wet mdws, and streamsides throughout
Dodecatheon jeffreyi ; occas. lower creek sides
Draba cruciata var. *cruciata* ; upper n-facing slopes >8500 ft. a rare s. Sierra endemic
Draba stenoloba var. *nana* ; moist± shade, gravelly substrate along creek (s. limits near here?)
Draperia systyla ; common small openings rf <8500 ft.

Epilobium angustifolium ; occas streambanks
Epilobium brevistylum ; occas. creekside
Epilobium lactiflorum ; wet creekbanks mid elevations
Equisetum arvense ; occas along lower creek
Erigeron foliosus ; occas rocky opeinigns in rf
Erigeron peregrinus var. *angustifolius* ; common wet mdws and streamsides throughout
Eriogonum nudum ; occas rocky areas and ridges, mc <8600 ft.
Eriogonum spergulinum var *pratense* ; sunny openings and dry ridges <7600 ft.
Eriogonum wrightii ssp. *subscaposum* ; occas metamorphic outcrops ca 7500 ft.
Erysimum capitatum ; occas. openings wf
Erysimum perenne ; fairly common in openings in rf, wwp, 7500-9200 ft.
Eupatorium occidentale ; rocky outcrops, occas upper elevs.
Fritillaria pinetorum ; fairly common in small openings, rocky ridges, rf 7000-9000 ft.
Galium bifolium ; small annual in small rf openings and along creek
Galium bolanderi ; occas xeric se-facing slopes mcf
Galium sparsiflorum ; outcrops and rocky ridges 7200-8300 ft.
Galium trifidum var. *pusillum* ; in flowing water and along wet streambanks 7000-7400 ft.
Gayophytum diffusum ssp. *parviflorum* ; occas. gravelly banks of stream and rocky ridges <7500 ft.
Gayophytum sp.; ocasional openings in rf
Glyceria striata ; occas along creek and in wet meadows
Graminae sp.; opeining near summit on n slope ca 9200 ft. w/ *Astragalus bolanderi,* not in flr.
Habenaria dilitata ssp. *leucostachys* ; occas along creek and in wet mdws
Habenaria sparsiflora ; common laong wet streamsides
Habenaria unalascensis ; occas., in lower rf and wf forest <7500 ft.
Hackelia jessicae ; smaller flrs than mundula, similar habitat to *mundula* , less common
Hackelia mundula ; common in small opeinings in rf 7800-9236 ft.
Helenium bigelovei ; common along creek
Heleocharis sp.; wet meadow ca 8600 ft.
Heracleum lanatum ; common along creek
Hesperochloa kingii : fairly common in small openings to semi-shade in rf <8700 ft.
Hieracium albiflorum ; wf forest below 7600 ft,

Hieracium horridum; rocky openings in rf
Holodiscus microphyllus ; occas rocky slopes 7000-9100 ft.
Hydrophyllum occidentale ; occas. semi-shade rf
Hypericum anagalloides ; wet mdws. up to 8600 ft.
Juncus parryi ; common on high n-facing slopes ca. 8800-9100 ft.
Keckiella rothrockii ; uncommon , talus nw-slope ca 8500 ft.
Ledum glandulosum var. *californicum* ; boggy meadows at head of creek ca 8600 ft.
Lewisia triphylla ; common moist rocky ledges along creek 7000-8000 ft.
Lilium kelleyanum ; occas along creek
Lilium parvum ; occas along creek
Linanthus ciliatus ; occas lower leevs openings in rf and wf forest
Linanthus oblanceolatus ; uncommon at moist head of creek n slope ca 8800 ft. typically a subalpine plant of S sierra
Lingusticum grayi ; common moist mdws
Lithophragma bolanderi ; uncommon semi-dry banks of lower creek
Lonicera involucrata ; occas. along lower creek
Lotus oblongifolius var. *nevadensis* ; lower elevs. along creek
Lupinus adsurgens var. *undulatus* ; occas drier rf and wf forest lower elevs. <7500 ft.
Lupinus andersonii ; common in small opeinings in rf throughout; some look more like *L. albicaulis* (if so may be s limits)
Lupinus polyphyllus ssp. *supurbus* ; wet meadows and creeksides 7000-8800 ft
Luzula parviflora ; occas along creek
Madia elegans ssp. *wheeleri* ; sunny openings lower elevs <7500 ft,
Melica stricta ; rocky slopes <7600 ft.
Mentzelia sp.; uncommon in clear-cuts adjacent to RNA
Mertensia ciliata ; common along moist creekside, near s limits
Microsteris gracilis ; openings rf
Mimulus floribundus ; only seen at low elevs alng creek ca 7000-7200 ft.
Mimulus guttatus ; common along creek
Mimulus lewisii ; occas along creek
Mimulus primuloides ; occas wet mdws., and seeps more at lower eldv
Mimulus primuloides var. *pilosellus* ; upper wet mdws 8000-8800 ft.
Mimulus whitneyi ; colonies common on rocky or early drying opeinings 7000-9000 ft., a minority are purple flowered
Mitella breweri ; common , wety shady banks along creek edges of rf
Monardella odoratissima ssp. *pallida* ; common rocky openings rf, wwp, mc
Nasturtum officinale ; common in and along lower creek
Nemophila pedunculata ; occas low elev rock outcrops
Onychium densum ; se slope in mcf
Orobanche uniflora var. *minuta* ; on *Saxifraga nitifica* along lower creek
Orochaenactis thysanocarpha ; occas. rocky ridges (granite and metamorphics), throughout
Osmorhiza chilensis ; common in wf and lower elev rf below ca 7600 ft.

Oxypolis occidentalis ; wet creeksides
Parnassia sp.; wet mdw not in flr ca 8600 ft.
Pedicualris groenlandica ; boggy mdw. ca. 7200 ft. young foliage of this or *P. attolens* in upper wet mdw. ca 8600 ft.
Pedicularis semibarbata ; common in rf throughout
Pellaea breweri ; occas rock outcrops and talus upper elevs open rf, wwp
Pellaea bridgesii ; metamorphic (mostly) outcrops ca 7000-7500 ft.
Penstemon caesius ; rare only at upper elevs in wwp ca 9100 ft.
Penstemon heterodoxus ssp. *cephalophorus* ; moist mdws. 8600- 8800 ft.
Penstemon laetus ; rocky ridges metamorphics ca. 7000-7500 ft.
Penstemon newberryi ; outcrops lower elevs.
Phacelia eisenii ; low annual, edge of clear-cut ca. 8200 ft., rocky mc 8400 ft.
Phacelia mutabilis ; occas. rocky ridges and dry opeinings in rf >8200 ft.
Phacelia ramosissima ; occas openings in rf
Phlox diffusa ; fairly common on higher ridges and rocky opeinings rf and wwp 8500-9200 ft.
Pinus contorta ssp. *murrayana* ; common around meadows and moist slopes to 8900 ft. also along lower creek ca 7000 ft
Pinus jeffreyi ; common on s and e-facing slopes up to 8700 ft.
Pinus lambertiana ; common on e and se facing sloeps below 8200 ft
Pinus monticola ; 7000-9236 ft.,. upper elev. dominant on n slopes above 8800 ft.
Poa fendleriana ; occas in small openings in rf throughout
Polygonum bistortoides ; wet mdws., creeksides
Potentilla drummondii ; occas. moist soil along creek and mdw edges
Potentilla glandulosa ssp. *nevadensis* ; occas moist mdws
Prunella vulgaris ssp. *lanceolata* ; occas along creek below 7200 ft.
Prunus emarginata ; mtn chap. s and e facing rocky slopes
Pteridium aquilinum var. *pubescens* ; occas in moist areas adjacent to creek in rf, meadow edges, etc.
Pterospora andromedea ; occas rf
Pteryxia terebinthina var. *californica* ; common open, rocky sites in rf 7800-9236 ft., petal size is variable
Pyrola picta ; occas wf, rf
Pyrola picta ssp. *dentata* ; occas dry wf, mcf
Pyrola secunda ; shady meadow-forest ecotones 8000-8800 ft.
Quercus kelloggii ; occas s or e facing slopes in mcf and wf lower elevs.
Ranunculus alismaefolius var. *alismellus* ; common in wet mdws and streamsides throughout
Rhamnus californicus ; mc, rocky se exposures
Ribes cereum ; abundant in clear cuts adjacent to drainage, also common in openings in rf throughout
Ribes lasianthum ?; not in flr. low spreading prickly shrub edge of mdws and talus at upper elevs ca 8600 ft.
Ribes nevadense ; occas on lower creek

Ribes roezlii ; occas lower rf and wf openings
Ribes viscossimum ; common in understory of rf (semi-shade to moderately open) 7000-8700 ft.
Salix caudata var. *bryantina* ; common along lower creek <8000 ft.
Salix drummondiana var. *subcoerulea* ; wet mdws., head of creek , may be S. limits in Sierra
Salix pseudocordata ; along stream ca. 8000 ft.
Salix scouleriana ; occas along lower creek
Sambucus caerulea ; occas talus 8500 ft.
Sambucus microbotrys ; occas along creek and upper moist slopes 7000-8800 ft
Sanicula graveolens ; small rocky openings in rf ca 7800 ft
Sarcodes sanguinea ; rare, n slope rf ca 8200 ft.
Saxifraga nidifica ; common wet banks along creek, spreads by bulblets
Saxifraga oregana ; uncommon along lower creek, wet, mossy rocks, may be s limits
Saxifraga punctata ssp. *arguta* ; common wet, mossy streamsides throughout
Senecio integerrimus ; common in openings in rf up to 9000 ft.
Senecio triangularis ; common wet meadows
Sidalcea oregana ssp. *spicata* ; fairly common along lower creek
Silene sp.; not in flr. occas. rf , wf
Sitanion hystrix ; rocky ridges throughout
Smilacina racemosa ssp *amplexicaulis* ; occas rf, wf
Smilacina racemosa var. *glabra* ; occas. open rf, wf
Solidago californica ; occas open forest wf
Solidago canadensis ; occas along creek
Sorbus californica ; uncommon along creek
Stachys albens ; creekside, moist areas 7000-8000 ft.
Stephanomeria lactucina ; occas open rf
Stipa columbiana ; occas. in openings throughout
Stipa lettermanii ? ; small mostly glabrous fruits and awns, near summit on n slope opening w/ *Astragalus bolanderi*
Streptanthus tortuosus ; metamorphic talus 7200-7400 ft.
Symphoricarpos acutus ; occas lower elev rf, wf
Taraxacum officinale ; occas. mesic clear-cuts, streamsides etc.
Tetradymia canescens ; fairly common rocky ridges 7300-9000 ft. generally an e Sierra (Kern Plateau, etc.) taxon
Thalictrum fendleri ; occas along creek
Trifolium monanthum ; tiny, along creek 7000-7500 ft,
Trifolium sp.; native perennial not in flr, upper boggy mdw ca 8600 ft.
Veratrum californicum ; common, wet meadows
Veronica serpyllifolia var. *humifusa* ; common along creek 7000-8000 ft.
Viola macloskeyi ; occas. along creek and wet mdws.
Viola purpurea var. *xerophyta* ; openings rf
Zigadenus exaltatus ; occas dry rocky s facing slopes low elevs

Appendix 2
Vertebrates From Mountaineer Creek
(56 species)

This list includes all vertebrate species detected during the four day ecological survey June 19-22, 1990. Habitat abbreviations are the same as in Appendix 1.

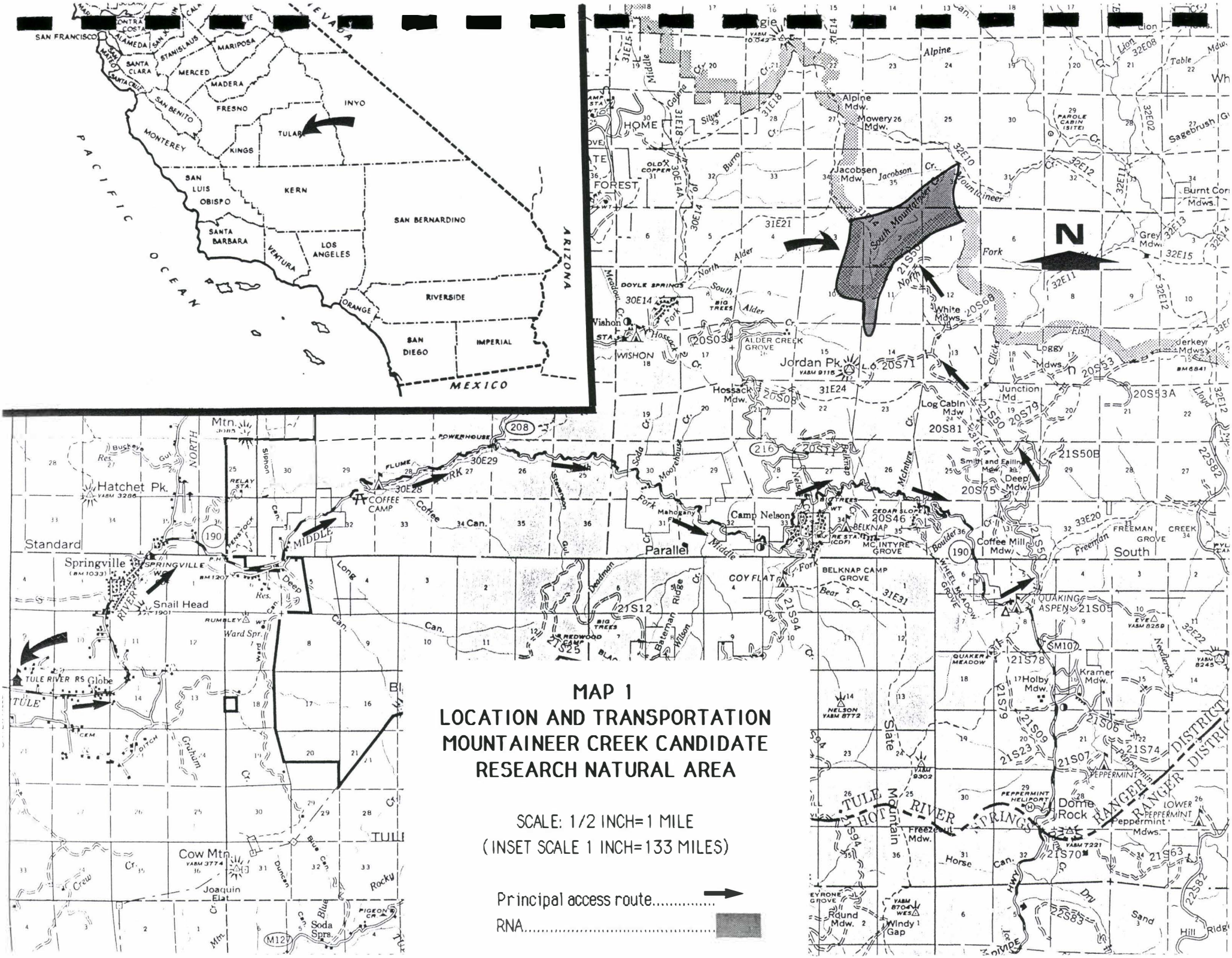
FISH
Little Kern Golden trout: common in lower and mid-reaches of creek up to 10 inches long

AMPHIBIANS
Mountain yellow-legged frog; occasional along creek up to source ca 8600 ft.

BIRDS
Mountain quail; occas. mc, open rf, clearcuts throughout
Red-tailed hawk; uncommon 2 in 4 days
Golden eagle; sighted once in four days
Band-tailed pigeon; occas in and over rf
Poorwill; uncommon mc and clearcuts adjacent to RNA
Rufous hummingbird; males seen in mc and clearcuts on *Castilleja applegatei* and *Ribes cereum*
Calliope hummingbird; fairly common esp. on *Ribes viscossum* and *R. cereum* in clearcuts
White-throated swift; occasional small flocks over e side of area
White-headed woodpecker; fairly common throughout
Williamson's sapsucker; rare, one seen on s edge of RNA
Red-breasted sapsucker; occasional rf forest
Hairy woodpecker; fairly common rf, nesting June 21
Northern flicker: fairly common throughout
Hammond's flycatcher; occasional in relatively closed rf
Dusky flycatcher; occas open rf, mc, clearcuts
Olive-sided flycatcher; occas. throughout
Western wood pewee; occas. throughout
Mountain chickadee; fairly common throughout
Steller's Jay; fairly common throughout
Clark's nutcracker; fairly common upper elevs.
Common raven; occasional throughout
Water ouzel; rare, one seen on Main fork Mountaineer Creek ca 6900 ft.
American robin; fairly common mesic rf, streamsides, and meadows
Mountain bluebird; juveniles occas. open ridges, mc north side of RNA
Townsend's solitaire; fairly common in rf forest
Hermit thrush; common in rf forest throughout

House wren; uncommon clearcuts adjacent to RNA
Brown creeper; occas throughout rf, wf, mcf
White-breasted nuthatch; uncommon open rf e-facing slope
Red-breasted nuthatch; common in rf
Golden-crowned kinglet; common rf forest
Nashville warbler; only heard singing on e-facing slopes in mcf
MacGillivray's warbler; uncommon riparian scrub, lower elev. creekside
Hermit warbler; occasional in fir forests
Yellow-rumped (Audubon's) warbler; common throughout
Western tanager; fairly common throughout
Lazuli bunting; breeding in clear cuts adjacent to RNA
Green-tailed towhee; uncommon clearcuts, mc
Black-headed grosbeak; rare, one seen in rf adjacent to moist mdw, post-breeding wanderer from lower elev.
Evening grosbeak; flocks common rf, clearcuts, also breeding activity (nesting material being gathered) in rf
Fox sparrow: common in clear cuts adjacent to RNA, also mc on n boundary
Chipping sparrow; occas in openings in rf, wwp, wf, mc throughout
Dark-eyed (Oregon) junco; common in more open rf and wf throughout
Red crossbill; very common in flocks up to 75 throughout upper elevations
Pine siskin; common throughout
Cassin's finch; common rf and clearcuts

MAMMALS
Douglas squirrel; fairly common rf
Lodgepole chipmunk; common in red fir forest up to summit, arboreal
Golden-mantled ground squirrel; fairly common in openings in rf, mc, clear-cuts
Mountain pocket gopher; common in more loamy soils of openings throughout
Porcupine; bark gnawing on rf and lodgepole pine
Pika; heard in talus at head of drainage ca 9100 ft. may be furthest south in Sierra
Black bear; sign including wallows, tracks, and scat widespread and common
Mule Deer; fairly common throughout



MAP 1
LOCATION AND TRANSPORTATION
MOUNTAINEER CREEK CANDIDATE
RESEARCH NATURAL AREA

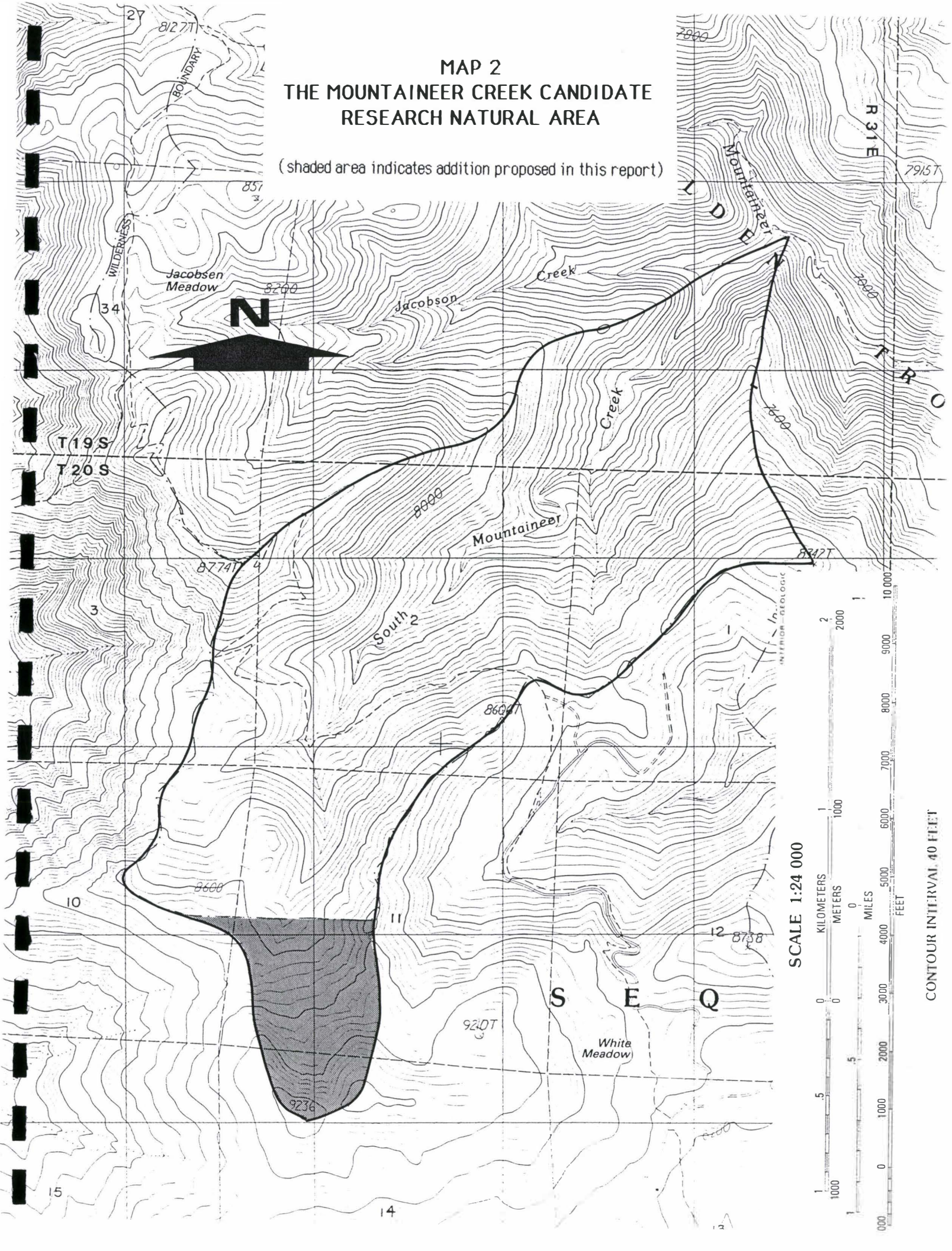
SCALE: 1/2 INCH=1 MILE
(INSET SCALE 1 INCH=133 MILES)

Principal access route.....

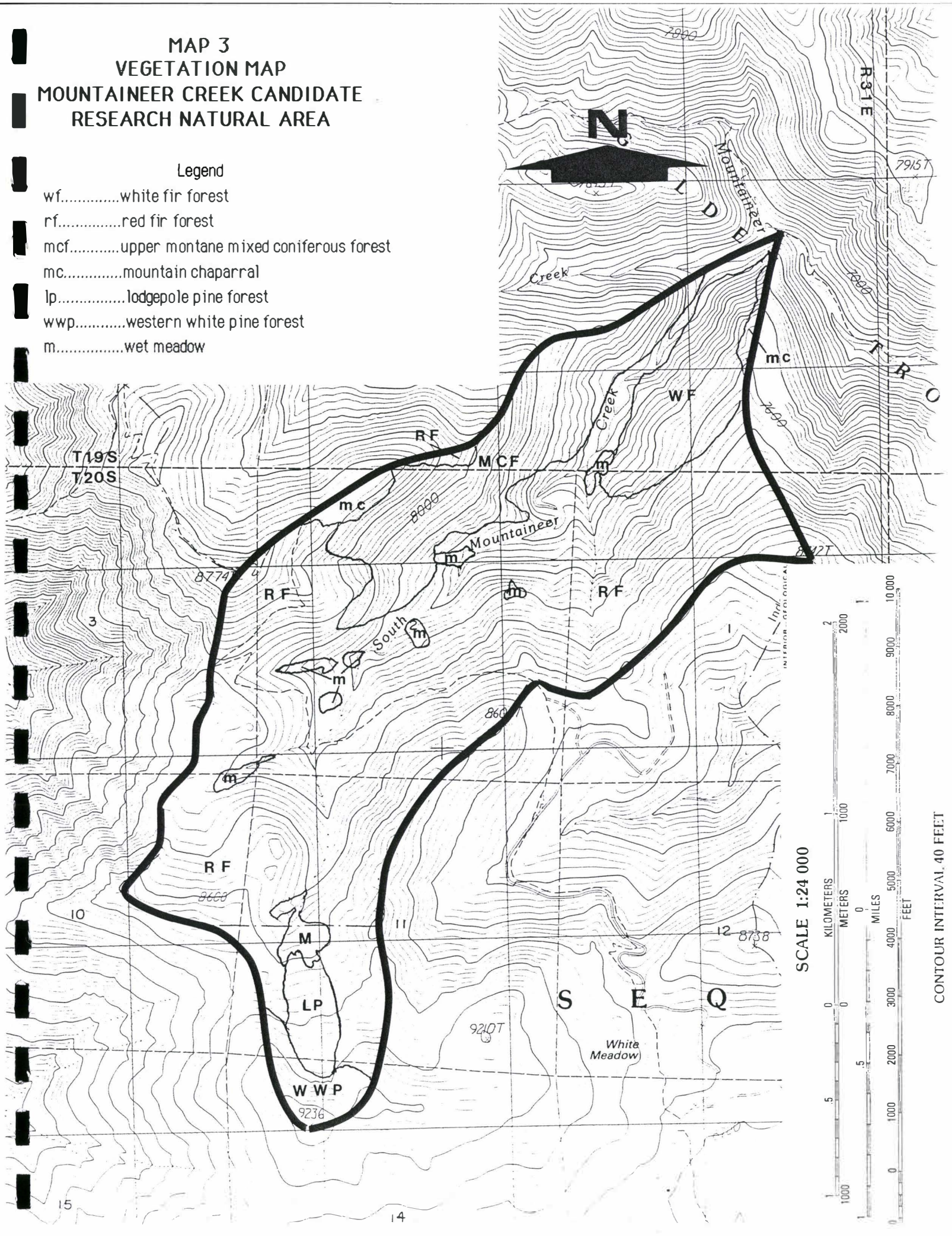
RNA.....

MAP 2
THE MOUNTAINEER CREEK CANDIDATE RESEARCH NATURAL AREA

(shaded area indicates addition proposed in this report)



MAP 3
VEGETATION MAP
MOUNTAINEER CREEK CANDIDATE RESEARCH NATURAL AREA



MAP 4
SOIL MAPPING UNITS
MOUNTAINEER CREEK CANDIDATE RESEARCH NATURAL AREA

Legend

400.....Rock outcrop
410.....Rock outcrop-Toem
604.....Cannell-Sirretta-Nanny family
622.....Dome-Chaix-Rock outcrop
646.....Cannell-Kriest family-Rock outcrop

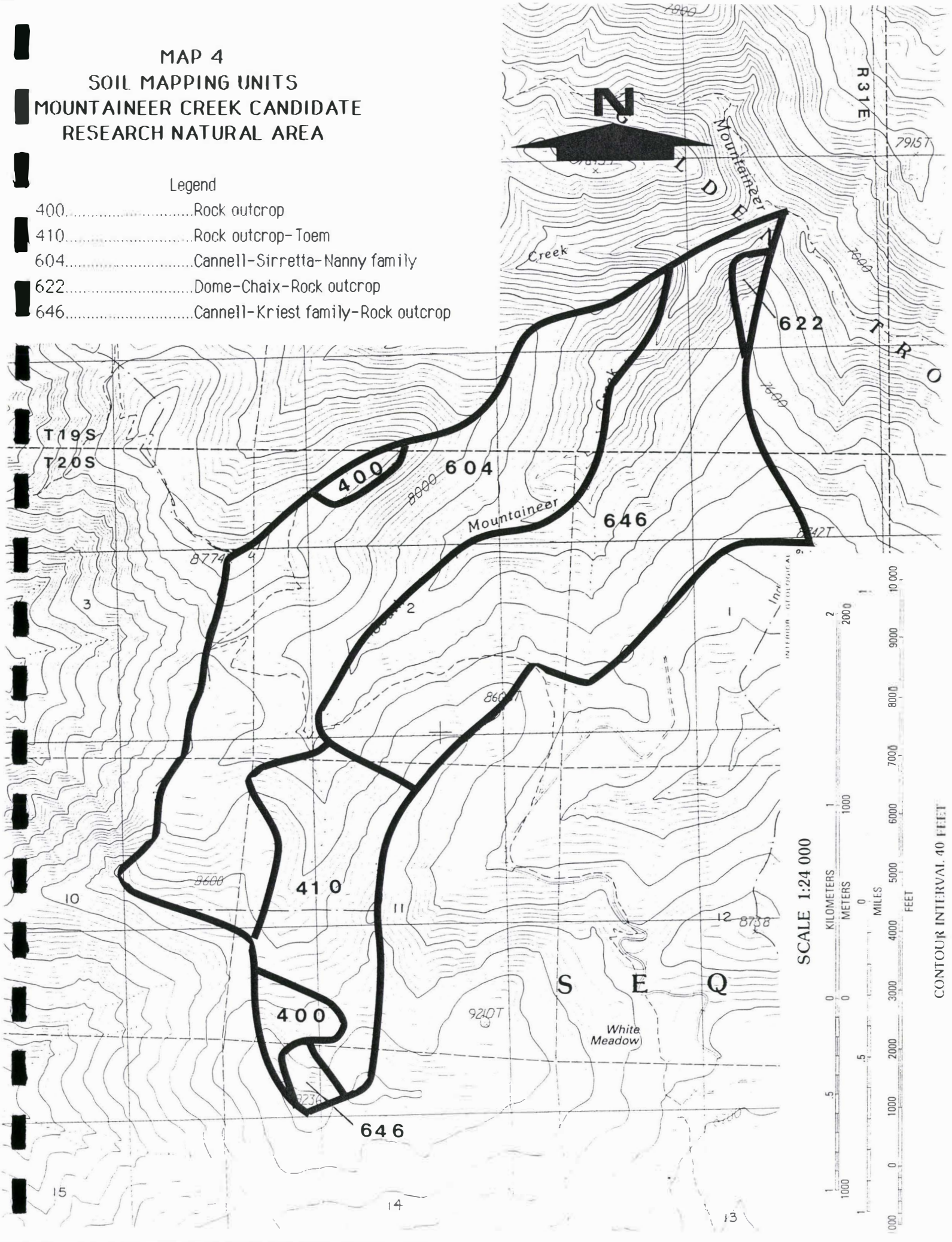


PHOTO 1

PHOTO 2

PHOTO 3

PHOTO 4

PHOTO 5

PHOTO 6

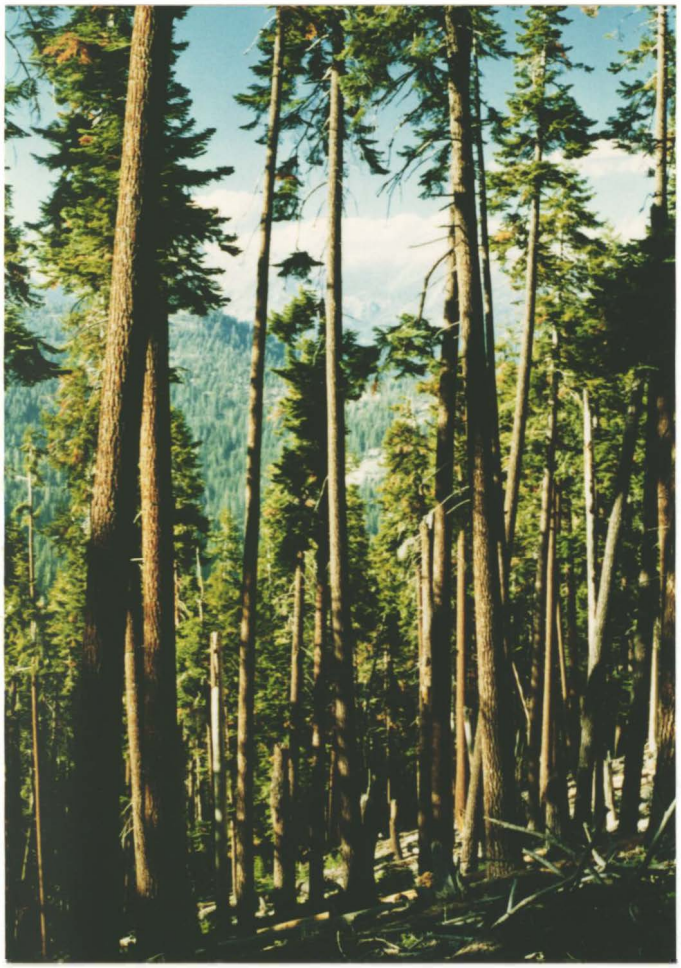


PHOTO 7

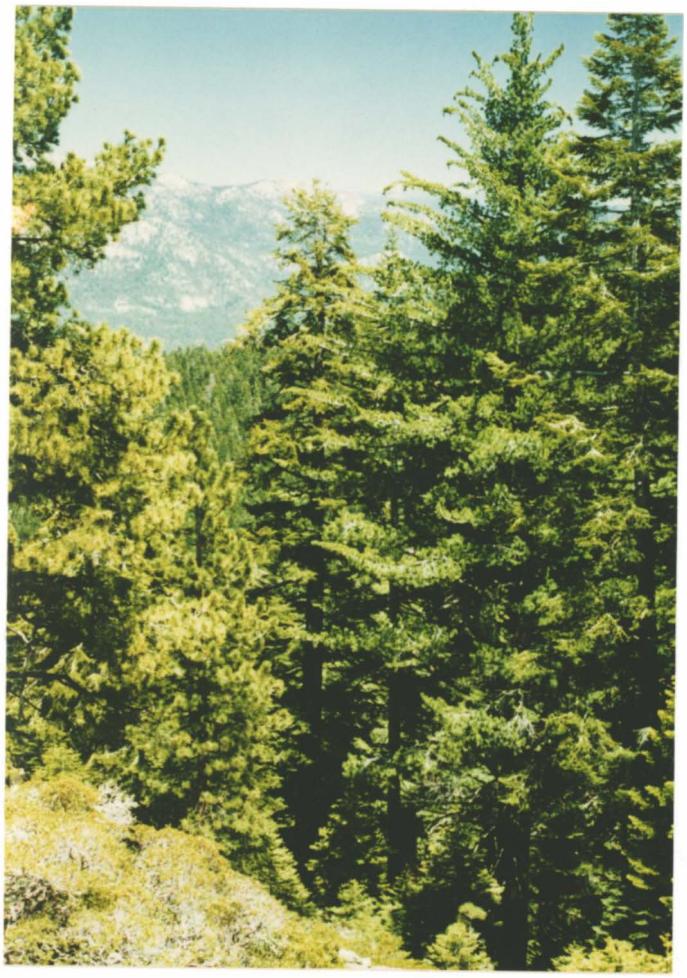


PHOTO 8

PHOTO 9

PHOTO 10

PHOTO 11

PHOTO 12

PHOTO 13

PHOTO 14

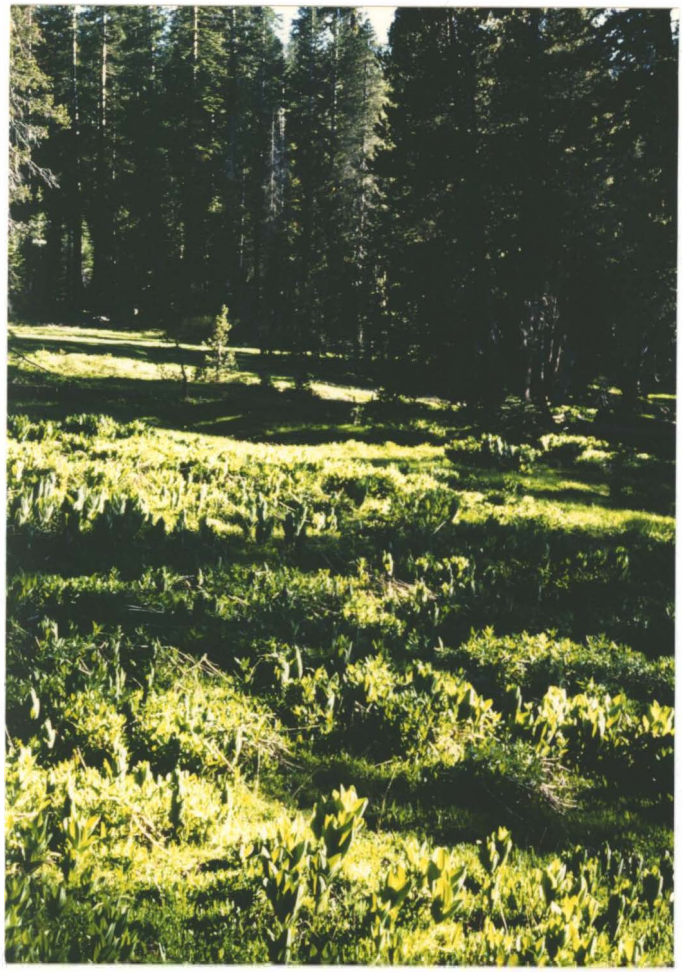


PHOTO 15

PHOTO 16

PHOTO 17

PHOTO 18

PHOTO 19

PHOTO 20

PHOTO 21

PHOTO 22

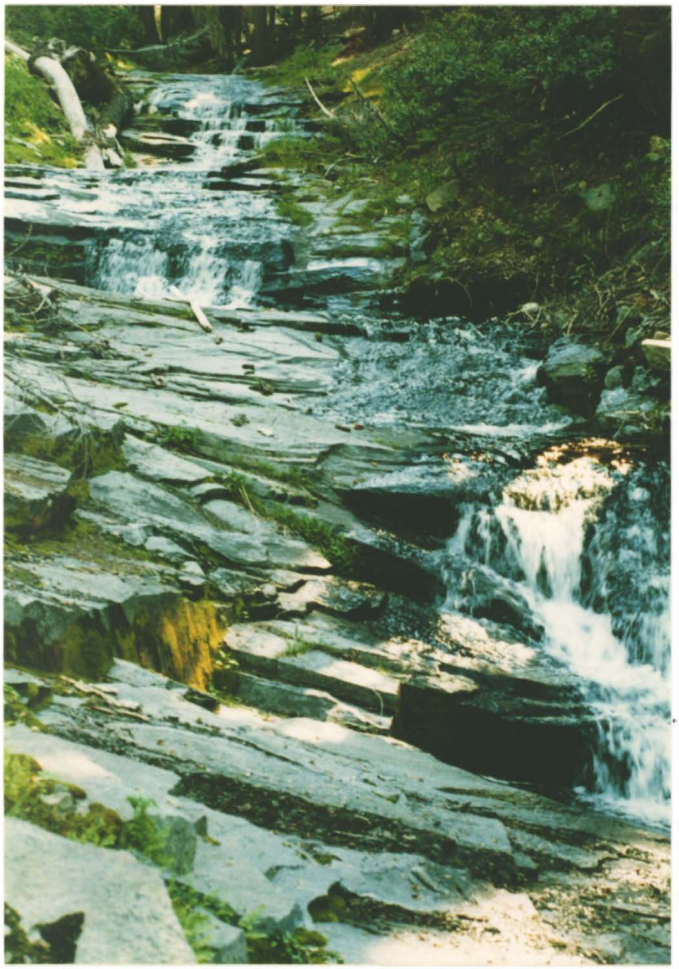


PHOTO 23

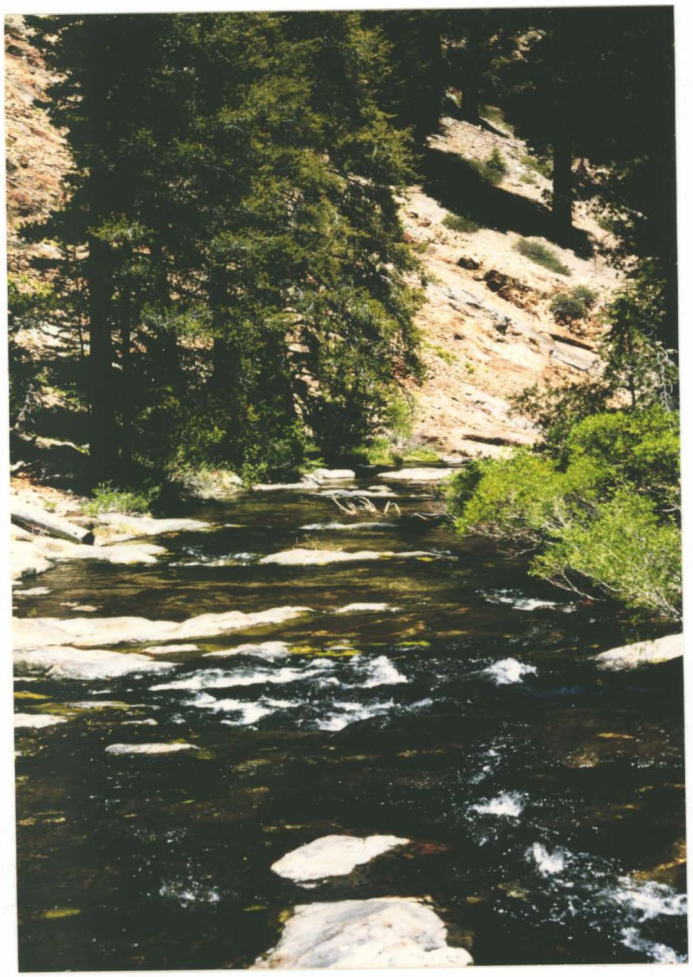


PHOTO 24

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Ecological Survey of the Proposed Mountaineer Creek Research Natural Area Sequoia National Forest, Tulare County, California

DATE | ISSUED TO
JUL 29 1992 Wendy Philpott
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